

Issues Relating to State Programs for Emergency Medical Services and the State's Trauma System

July 2014

Interim Study Committee on Public Health,
Behavioral Health, and Human Services

Indiana Legislative Services Agency

Legislative Evaluation and Oversight

The Office of Fiscal and Management Analysis is a division within the Legislative Services Agency that performs fiscal, budgetary, and management analysis. Within this office, analysts evaluate state agency programs and activities as set forth in IC 2-5-21.

The goal of legislative evaluation and oversight is to improve the legislative decision-making process and, ultimately, state government operations by providing information about the

performance of state agencies and programs through evaluation.

The office prepares reports for the Legislative Council in accordance with IC 2-5-21. The published reports describe state programs, analyze management problems, evaluate outcomes, and include other items as directed by the Legislative Evaluation and Oversight Policy Subcommittee of the Legislative Council. The report is used by an evaluation committee to determine the need for legislative action.

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Preface

Each year, the Legislative Services Agency prepares reports for the Legislative Council in accordance with IC 2-5-21. As directed by Legislative Council Resolution 13-03, this report is a study evaluating the efficacy of housing all state programs relating to emergency medical services and the state's trauma system within one state agency, and comparing Indiana's trauma system to trauma systems in other states. This report contains information on EMS services and trauma care in Indiana and examines the role of the Indiana State Department of Health and the Indiana Department of Homeland Security.

We gratefully acknowledge all those who responded to our questions concerning EMS services and trauma care or who assisted in the preparation of this report.

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Trauma Care

State law defines trauma care to mean the assessment, diagnosis, transportation, treatment, or rehabilitation by a health care provider of an acute bodily injury that requires immediate intervention to prevent the loss of life or a serious impairment of a body function or part. [IC 16-18-2-354.5]

One of the important elements of trauma is the severity of the injury. As state law defines it, if the loss of life or serious impairment of a body function is not at risk as a result of injury, then the incident is an emergency, but may not be trauma.

Another essential element of trauma is timeliness of intervention. The speedy response to a trauma event and transport to treatment center is key to increasing the survivability and minimizing the impairment caused by an injury.

Many emergencies do not have either the severity of injury or the necessity for immediate care that would classify them as a trauma event. A national EMS incident database contains the primary impression of the cause of an EMS incident by the EMS provider, but the primary impression is not always recorded. On average in 2012 and 2013, where the primary impression of the incident was reported, about 22% of the runs involved trauma. (59)

Examples of Trauma

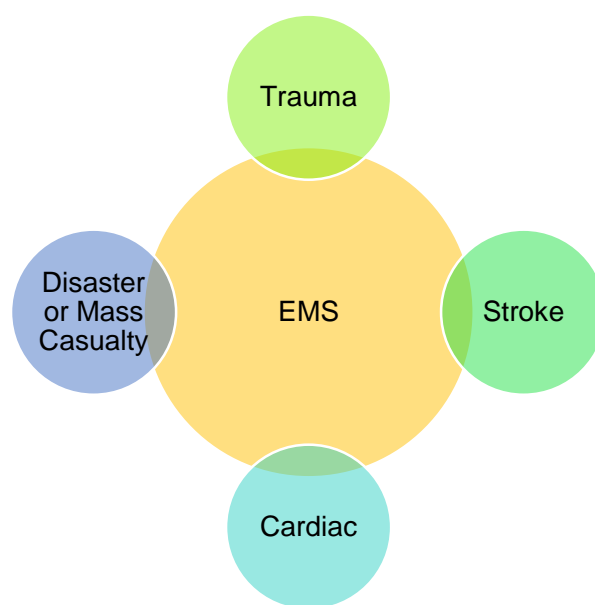
A firefighter at the scene of a fire cuts her hand. The paramedic onsite is able to take care of the injury. This is NOT trauma.

EMS arrives to find a person passed out on the floor, apparent problem with diabetes. This is NOT trauma.

EMS arrives to find a person passed out on the floor, apparent problem with diabetes. The unconscious person is bleeding from a cut to the head. This IS trauma.

An accident on the highway results in a severe broken leg with multiple fractures. This IS trauma.

Emergency Medical Services Specialty Services



Emergency Medical Services (EMS)

State law defines emergency medical services (EMS) to be the provision of emergency ambulance services or other services, including extrication and rescue services, utilized in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury. [IC 16-18-2-110]

EMS is the intersection of public health, public safety, and acute patient care. (11, p.x) EMS has a larger role than trauma care alone. Some of the specialty services that EMS provides include cardiac and stroke care. EMS may also transport patients between trauma centers once a patient has been stabilized or to facilities with additional services. Both EMS and the trauma system are important to disaster planning and treatment of mass casualties, either from natural disaster or large accidents. However, EMS is integral to the trauma system because EMS is a significant gateway to the trauma system.

The term 'EMS' has varied usage. For example, one may call 911 or EMS, referring to the service. EMS may also refer to providers of emergency medical services.

The Legislative Council requested a study evaluating the efficacy of housing all state programs relating to emergency medical services (EMS) and the state's trauma system in one state agency and comparing Indiana's trauma system to trauma systems in other states.

The Indiana State Department of Health (ISDH) and the Emergency Medical Services Commission (EMS Commission) and the Division of Fire and Building Safety, Public Safety Training and Certification Branch within the Department of Homeland Security (Homeland Security), which provides administrative support to the EMS Commission, are the state agencies directly involved with the state trauma system and EMS.¹ Briefly, ISDH is the lead agency for the statewide trauma system, and the EMS Commission licenses and regulates many of the professionals, equipment, and facilities that deliver EMS services.

To examine this question, the trauma care and EMS systems were explored with review of the statutes and rules governing the system, as well as the trauma care plan that is in development. The personnel and facilities involved in the state's EMS and trauma systems were reviewed, and systems in other states were explored. From these studies, several issues that are key to the efficacy of collocating these programs were uncovered. Additionally, the state agencies currently involved in licensing and regulation of the components of the system were examined. It is the ability of these state agencies to address the key issues that answers the question about the most effective organizational structure to administer the state trauma and EMS systems.

The key issues found through the examination of the state's EMS and trauma systems and the state agencies are detailed below.

- (1) Rural health care and the coverage of state residents is improved with an emphasis on getting trauma patients to a trauma center within the "golden hour".
- (2) Indiana may have higher-than-average coverage by lower-level EMS services providers.
- (3) A large percentage of EMS services providers are fire departments, and many of those are volunteer fire departments. Both volunteer EMS providers and compensated lower-level providers may not have economic incentives to receive or maintain training, and low wages and high certification costs may be driving personnel away from EMS services employment.
- (4) Legislative changes to licensing of midlevel EMTs may have additional expenses for local units of government and further reduce the pool of available EMTs, especially since many of these personnel are volunteers.
- (5) Larger hospitals are buying out community hospitals and providing a larger share of the community's EMS services and trauma care, or eliminating the services currently provided.
- (6) The ISDH has been able to access funding through related programs within the agency to address some of the inadequacies of data for the trauma registry. However, prior funding levels have provided for minimal and inconsistent staffing at ISDH and have potentially slowed the development of the state's trauma registry.
- (7) A consultant report indicated that there was insufficient support for EMS within Homeland Security. The recommendations of the report to restructure the administration of EMS within Homeland Security have been undertaken. However, there is no evidence of greater funding for EMS as a result of the restructuring.

¹ The Professional Licensing Agency (PLA) also is involved in the state trauma system to the extent that state-licensed physicians are medical directors throughout the trauma and EMS systems. Physicians are licensed through the State Medical Board, which is administered by the PLA.

- (8) Reviews of other states provide examples of the efficacy of single and multiple state agencies providing EMS and trauma systems administration and reinforce the importance of data to improving both systems.

The details behind these findings will be presented below, with conclusions and recommendations provided at the end.

Trauma and Emergency Medical Services Systems Development and Growth

Civilian trauma care came to the forefront of national attention in 1966 with a report that identified trauma as the 'neglected disease'. (31, p.6)(49, p.10) Identifying trauma as a disease brought focus to one of the most significant causes of death for individuals between 1 and 44 years of age and referenced the high medical costs incurred each year to treat victims of trauma. (48, p.1) With trauma categorized as a disease, the public health model became relevant as a way to improve care and reduce trauma incidents. The public health model is a prescribed three-step approach (31, p.6)(49, p.10):

1. **Assessment** – The step in which problems are identified based on data.

State Agency Responsibility: Guide and monitor care provided in a defined statewide regionalized, coordinated, and accountable system of emergency care. (31, p.9)

2. **Develop Public Policy** – The step in which interventions are devised and implemented.

State Agency Responsibility: Bring together stakeholders and other state agencies to make recommendations on the development of the state emergency medical system. Plan, develop, lead, monitor, and regulate a comprehensive statewide system. Adopt and enforce standards for EMS. (31, pp.9-10)

3. **Assurance** – The step in which the outcomes of the interventions are evaluated.

State Agency Responsibility: Maintain an ongoing improvement process. (31, p.10)

Federal funding in the 1970s was provided to develop regional emergency medical services systems and trauma care services. (6, p.126) At this time in Indiana, regional coordination centers received federal funding through block grants and passed the funding through to local communities for training and planning for the development of emergency medical services. (26) Through the 1980s and 1990s, federal funding shifted from regional agencies to the states through block grants, eventually tailing off in the late 1990s and 2000s. In Indiana, the regional coordination centers were disbanded. States have tended to provide minimal funding that is mostly aimed at licensing and regulation and not system development. (17, p.2)(31, p.3)

Emergency medical services are contracted by local units of government, including townships, towns, cities, and counties. The level of care available to a local unit of government is often based on the financial resources of the community. (26)

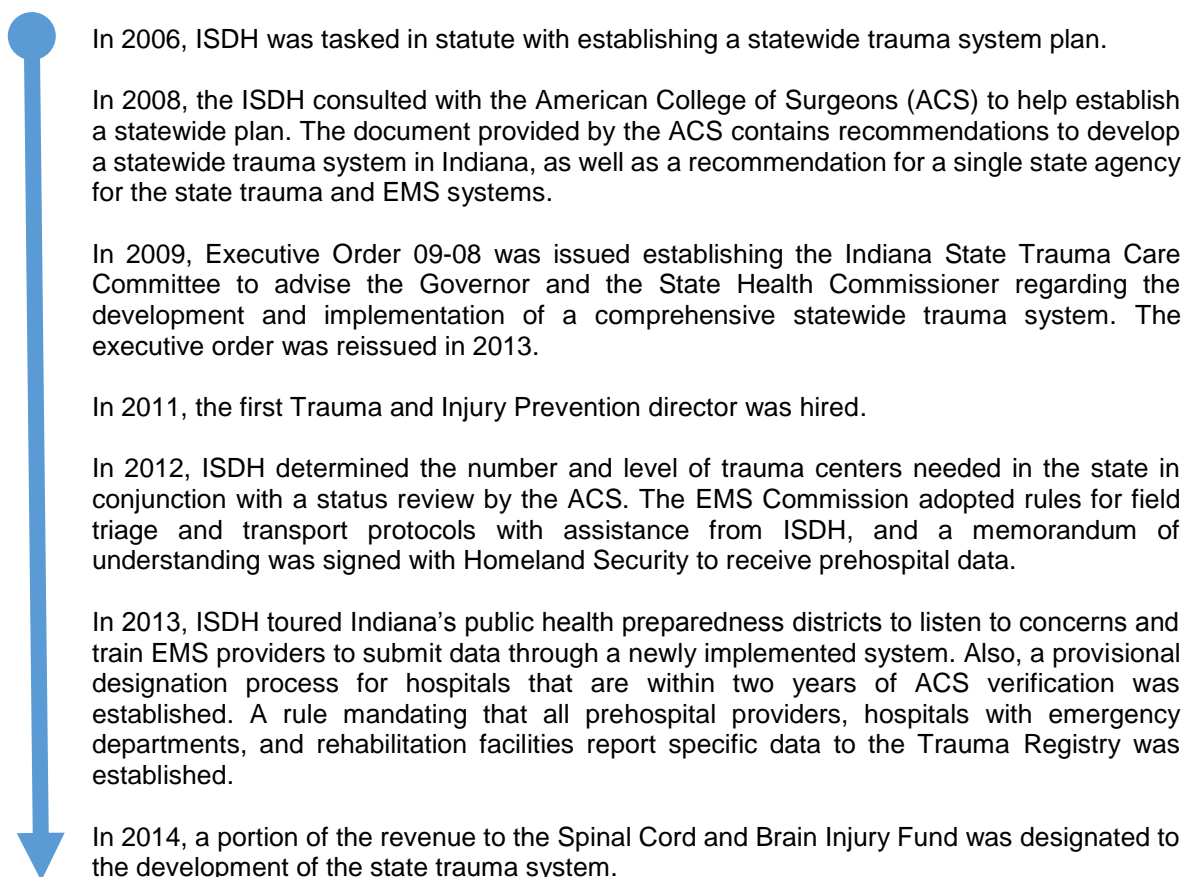
Research concerning trauma and EMS incidents led to a targeted "golden hour" in which death and serious impairment from injury are minimized. The incidence response of a trauma system involves local or regional agencies, providers, and facilities as a result of the focus on immediate care, as well as the early targeting of federal funding and minimal state fiscal involvement.

Indiana Trauma System History

In 2006, the ISDH was statutorily appointed the lead agency in developing, implementing, and maintaining a statewide trauma care system to prevent injury, save lives, and improve the care and outcomes of individuals injured in Indiana. [IC 16-19-3-28] An integral part of this responsibility is development of a state trauma system plan. A state trauma system plan envisions the procedures and operations to achieve the plan, providing direction for all providers and users of the system. (49, p. 24)

ISDH indicates that the agency is still developing a statewide trauma care plan. To date, the ISDH has worked on data collection and analysis with the Trauma Registry, development of triage protocols and a provisional designation system for trauma centers, and a determination of the number and level of trauma centers needed. (18)

The brief timeline of events at the ISDH that follows shows the progress and milestones toward a formally adopted state trauma care system policy. (18)



Describing the State Trauma System

The ISDH has envisioned a trauma care system for Indiana in a white paper published in 2012. While the plan has not been formally adopted, the paper lays out the components of a trauma care system.

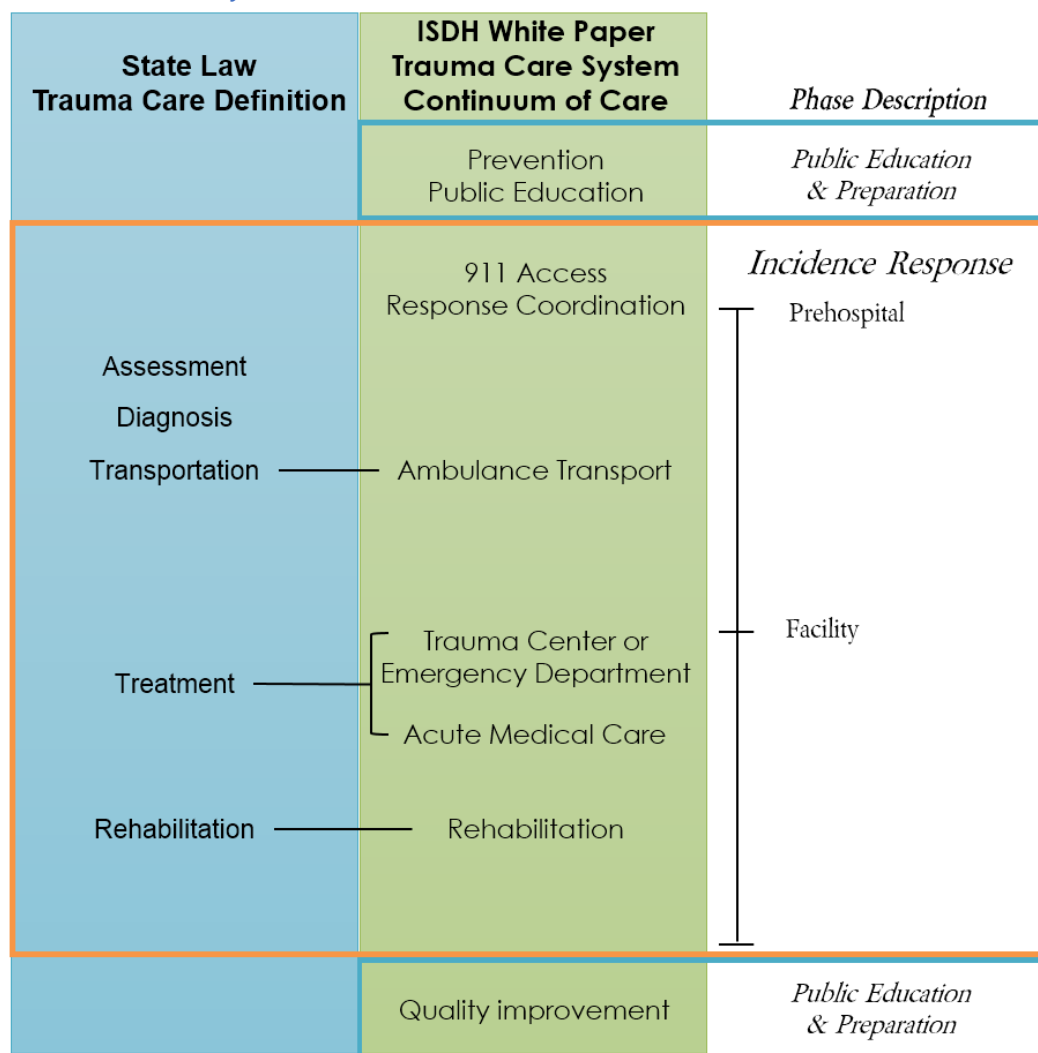
The white paper stated the following:

Trauma systems seek to decrease the incidence and severity of trauma; ensure optimal, equitable and accessible care for all persons sustaining trauma; prevent unnecessary deaths and disabilities from trauma; contain costs while enhancing efficiency; implement quality and performance improvement of trauma care throughout the system; and ensure certain designated facilities have appropriate resources to meet the needs of the injured. (17, p.4)

Figure 1 is a visualization of both the statutory definition of trauma care and the elements of a trauma care system described in the ISDH white paper. The state statutory definition of trauma care provides a

foundation for the system that the ISDH documents. As seen in Figure 1, a statewide trauma care system is a continuum of care that incorporates quality improvement and prevention, as well as the elements necessary to detect, diagnose, and treat trauma.

Figure 1. Indiana Trauma System



Source: (17)

Data Collection. While Figure 1 is a linear representation of the proposed trauma care system, the ISDH has indicated it is a continuum. A continuum indicates a circular relationship where a collection of related elements cycle from beginning to end and back again. In this case, a continuum also means that the outcomes of the process are collected and evaluated to determine the effectiveness of the cycle. Each phase of the continuum of trauma care should be data-driven.

The ISDH has undertaken trauma care quality improvement through the development of the trauma registry. [IC 16-19-3-28]² The ISDH uses the National Trauma Database's (NTDB) standard data elements in developing the trauma registry for Indiana. The prehospital data are reported to Homeland Security, and now with the rule adopted by the ISDH, they are reported to ISDH as well. Standardized data elements for EMS incident reporting come from the National Emergency Medical Services Information System

² Responsibility for the trauma registry was enacted along with the lead agency status in the 2006 legislation.

(NEMSIS). NEMSIS was developed to standardize the data elements collected among the states collecting trauma data. While some states have been collecting data since the 1970s, Indiana has not reported to NEMSIS until October 21, 2013. (34) There are now about 180,000 records in the NEMSIS system from Indiana.

The ISDH began collecting data from trauma centers and emergency rooms in 2008. However, it was not until 2012 that the ISDH and Homeland Security entered into a memorandum of understanding to receive data about the EMS portion of trauma incidents necessary for outcome evaluation. In April 2013, a portal to transfer the NEMSIS data between Homeland Security and the ISDH was opened. Even though this agreement existed, in 2013, the ISDH adopted a rule requiring EMS providers to provide data about the EMS portion of care to ISDH. [410 IAC 34]

Personnel and Facilities of the State EMS and Trauma Systems


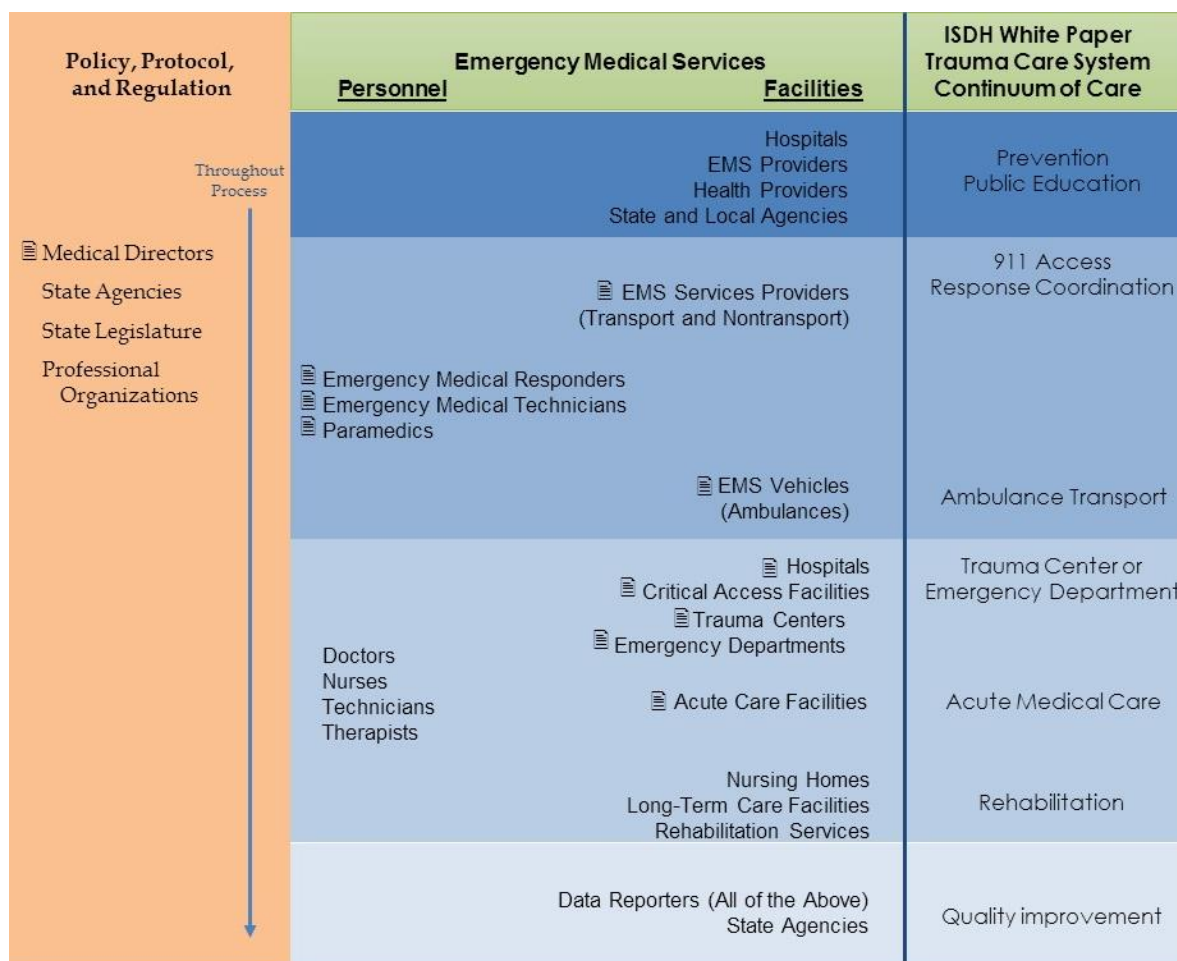
The individuals, facilities, and organizations that make up the trauma care system are shown in Figure 2. The phases from Figure 1 have been reconstructed into the color bands in Figure 2, and the provider, either personnel or facility, corresponding to the step in the trauma care system continuum of care have been added. The policy, protocol and regulatory agencies are shown to the left and, as indicated in Figure 2, these groups have a role throughout the system. The personnel and facilities of the state EMS and trauma systems that are denoted with an icon  will be discussed in this section.

Figure 2. Indiana EMS and Trauma Systems with Personnel and Facilities



While the overall system of care described is the trauma system, the EMS role occurs primarily during the prehospital phase of trauma care, including assessment, diagnosis, and transportation. The prehospital phase is also the time-sensitive phase limited by the “golden hour” between injury and hospital care for optimal outcomes. Paramedic and ambulance services may be involved after hospitalization to transport a stabilized patient to other acute care facilities or to make transfers to rehabilitation facilities. In fact, based on services provider assessments, Homeland Security estimates that general transportation services make up about 70% of the responses by state-certified ambulance services. Of the 30% of EMS runs that are emergency responses, only about 5% are trauma-related, resulting in about 1% of the total workload of ambulance services being trauma care. (16)

Medical directors and state agencies provide oversight, regulation, or licensing of the personnel and facilities throughout the entire system.

The recruitment and retention of facilities and personnel, particularly in rural areas of the state, is a major issue throughout the trauma care continuum. These issues will be discussed in more detail as the personnel and facilities in the EMS and trauma system are described below.

Medical Directors Each facility that is part of the system works under the guidance of a medical director as required by the various state laws that pertain to each organization. Each emergency medical service, ambulance service, and emergency medical services technician or paramedic must have a medical director to issue protocols and standing orders for the organization or individual under the state statutes and the rules of the EMS Commission.

The rules adopted by the EMS Commission require that a paramedic provider organization must have a medical director provided by the organization or jointly with a supervising hospital. The medical director must be a physician with an unlimited license to practice medicine in the state of Indiana. According to the administrative code, the medical director is to:

- (1) Provide liaison with physicians and the medical community.
- (2) Assure that the drugs, medications, supplies, and equipment are available to the paramedic provider organization.
- (3) Monitor and evaluate day-to-day medical operations of paramedic provider organizations.
- (4) Assist the supervising hospital in the provision and coordination of continuing education.
- (5) Provide individual consultation to paramedics.
- (6) Participate in at least a quarterly audit and review of cases treated by paramedics of the provider organization.
- (7) Attest to the competency of paramedics affiliated with the paramedic provider organization to perform skills required of a paramedic.
- (8) Establish protocols for basic and advanced life support in cooperation with the medical control committee of the supervising hospital.
- (9) Establish and publish a list of medications, including minimum quantities and dosages to be carried on the emergency medical services vehicle.
- (10) Provide liaison between the emergency medical service provider organization, the emergency medical service personnel, and hospital in regards to communicable disease testing. [836 IAC 2-2-1]³

Hospitals This section focuses on trauma centers and emergency rooms rather than the acute care or rehabilitation services that may be provided by hospitals or other facilities. However, the issue raised in this section concerning coverage of rural areas is the same for the acute care and rehabilitation services end of the continuum of care as well.

There is a four-tier scale recommended by the ACS with criteria used in determining the type or level of trauma care that is provided. The lower the number, the more robust the trauma care provided. The criteria

³ The responsibilities in this section apply to paramedic provider organizations. Since the rules for medical directors of other facilities and services are similar, only one set of rules was used to illustrate the duties of the medical director.

used to differentiate the levels include whether the facility has a teaching function, the qualifications of the physicians staffing the facility, and the range of care provided by the facility. The following are the general ACS criteria (33, p.2):

Level IV Emergency Department – 24-hour physician coverage; resuscitation and stabilization before transfer.

Level III Emergency Department – 24-hour coverage by emergency medicine physician; prompt assessment, resuscitation, and stabilization with transfer agreements to Level I and II facilities.

Level II Trauma Center – 24-hour general surgery and specialty care coverage; definitive care for all patients.

Level I Trauma Center – Leader in trauma education; 24-hour general surgery team on standby and prompt specialty care services available; provides services at all levels of the continuum from prevention to rehabilitation.

In 36 states, a state agency designates the level of trauma care for the facility. The ACS verifies facilities in Level I to Level III status through a voluntary process, but not all states that designate trauma care have ACS-verified facilities. (33, p.2) In the Indiana Code, the ISDH is given authority to implement standards and procedures for the designation of trauma care level. [IC 16-19-3-28]

ISDH administrative rules indicate that a trauma center provides trauma care and has been verified as a trauma center by the ACS, has been designated a trauma center under a state designation system that is substantially equivalent to the ACS verification process, or has been deemed to be in the process of ACS verification under rules adopted by the EMS Commission. [410 IAC 34-1-16] These “in the process” hospitals, in the EMS Commission-adopted administrative rules, are trauma centers that are in the process of verification by the ACS. ACS verification for a Level I trauma center requires a certain number of trauma care cases to verify the designated status.

A hospital may apply to the EMS Commission to be “in the ACS verification process” as a Level I, II, or III trauma center by providing substantial documentation that the hospital complies with the enumerated requirements. The forms for designation are available on the EMS Commission website. The EMS Commission staff at Homeland Security forwards the application to the ISDH for review. Once the ISDH staff reviews the application, it is forwarded to the Indiana State Trauma Care Committee (ISTCC). A subcommittee of the ISTCC reviews the application for compliance with the “in the process” protocols, and applications found to be complete are placed on the ISTCC’s agenda at one of its four annual meetings. The ISTCC may recommend to the State Health Commissioner that an application be approved or declined or given conditional approval pending a center’s improvement of outstanding issues. The State Health Commissioner makes a final determination. This is a provisional process, and ISDH anticipates adopting a designation rule at a later date. (5)

Indiana has nine adult and four pediatric trauma centers around the state. Additionally, there are six “in the process” facilities approved as of June 23, 2014. The trauma centers for adults and pediatric patients are colocated and are mostly located in urban areas. The “in the process” facilities are lower level and more rural. The trauma centers and “in the process” hospitals are listed on the next page.

Trauma Centers

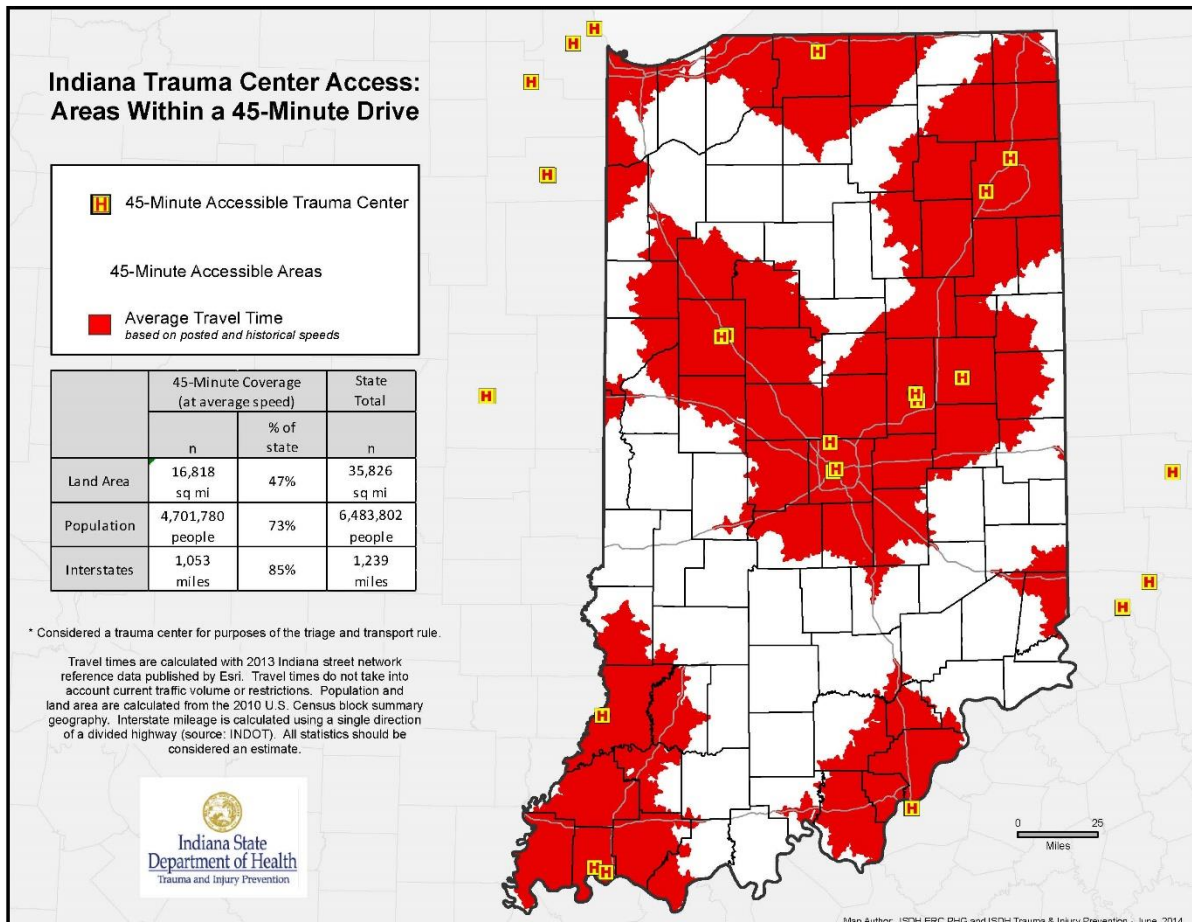
Memorial Hospital of South Bend
Parkview Regional Medical Center
Lutheran Hospital
IU Health-Riley Children's Hospital
IU Health-Methodist Hospital
St. Vincent Hospital
Eskenazi Health
Deaconess Hospital
St. Mary's Medical Center⁴

"In the Process" Hospitals

IU Health – Ball Memorial Hospital
Community Hospital of Anderson
Franciscan St. Elizabeth – East
St. Vincent - Anderson Hospital
IU Health – Arnett Hospital
Good Samaritan Hospital

The map in Figure 3 shows the drive times from the nine Indiana trauma centers and centers in neighboring states. As seen in the map, at least in terms of drive time, much of the state is not able to reach a trauma center within the "golden hour" between the time of injury and receipt of treatment. Of course, the ability to airlift the injured to a facility adds to the coverage, as seen in Figure 4. ISDH has been addressing the lack of coverage in rural areas of the state by approving more facilities to be "in the process". These "in the process" facilities provide more coverage and are available in Lafayette, Muncie, and Anderson. (4)

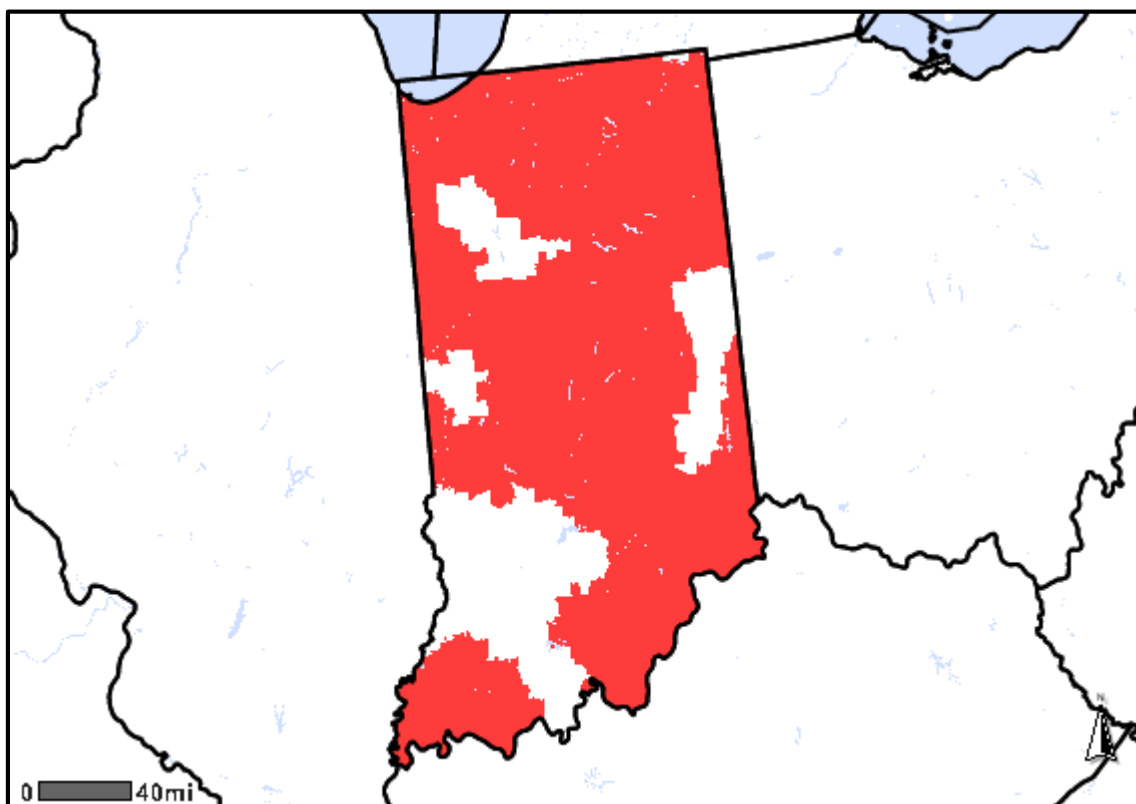
Figure 3. Indiana and Adjoining States Trauma Access



Source: ISDH

⁴ ISDH's website, retrieved at <http://www.state.in.us/isdh/25510.htm>, indicates that there are 9 trauma facilities, but the American College of Surgeons lists 13 trauma centers in Indiana because the ACS counts the pediatric centers separately.

Figure 4. Indiana and Adjoining States Trauma Access with Helicopter Capability



Source: (13)

Nationally, more than 50 million people (30.3% of the United States population) cannot reach a Level I or II trauma center within 45 minutes, and more than $\frac{3}{4}$ of the geographic area of the continental United States does not have access to a Level I or II trauma center within 45 minutes. (13) Yet reaching a Level I or II facility within 45 minutes when severely injured decreases the risk of death by 25%. (48, p.1)

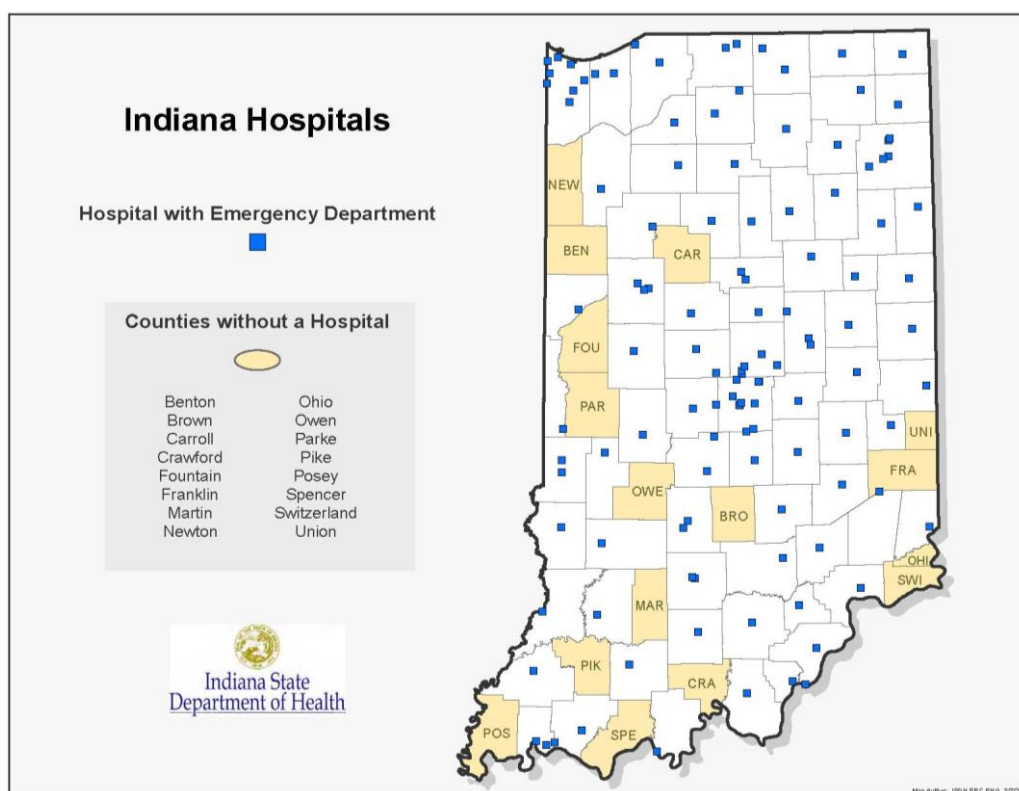
In Indiana, according to the ISDH white paper,

Most rural hospitals don't have the resources (like surgical specialties) to provide definitive trauma care, and there are no trauma centers in rural areas of Indiana. (17, pp.2-3)

By contrast, about 43.7% of Indiana's population cannot reach a Level I or II trauma center within 45 minutes by either helicopter or ambulance. However, the geographic coverage is better than the national average. (13)

As seen in Figure 5, Indiana has 129 acute care hospitals with emergency departments. Acute care is the opposite of long-term care and refers to the treatment of or surgery for injury or illness. Only 46 of the acute care hospitals are located in rural areas, and 16 of Indiana's 92 counties have no hospital. (4)(19) Of the 129 acute care hospitals, 35 are designated as critical access hospitals. (19) A critical access hospital is a Medicare designation that indicates a facility with fewer than 25 hospital beds and an average length of stay of less than 96 hours. Most critical access hospitals are located in rural areas, and they are required to provide 24/7 emergency care services. (50)

Figure 5. Indiana Hospitals with Emergency Departments or No Coverage Available



Source: ISDH

In an assessment of Indiana, the ACS recommended 7 to 12 adult Level I or Level II trauma centers for Indiana's 6.3 million residents. (19) In addition to designating more facilities "in the process" of attaining ACS verification, the ISDH has used federal grant money for rural health programs to provide the Rural Trauma Team Development Course, which is taught at rural hospitals across the state. The main purpose of the course that was developed by the ACS is to help rural hospitals make better decisions within a 15-minute timeframe on whether a hospital can meet a patient's needs or a patient needs to transfer to a facility with more services. (4)

Prehospital Services Providers. Prehospital services, otherwise known as EMS services, include the assessment, prehospital treatment, and transport of patients suffering from trauma and other conditions. In statute, emergency medical services are defined as serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury. [IC 16-18-2-110] Medical transport may include the transport of a patient from the scene of an accident or injury to the hospital, or it may be that EMS services are used to transport patients between facilities. EMS services are estimated by Homeland Security based on services providers' assessments to be about 30% of certified ambulance services' response work. (16)

In Indiana, services are considered advanced life support when they are provided by an advanced emergency medical technician (EMT) or a paramedic. The advanced life support level of care includes the following procedures:

- (1) Defibrillation.
- (2) Endotracheal intubation.
- (3) Parenteral injections of appropriate medications.
- (4) Electrocardiogram interpretation.
- (5) Emergency management of trauma and illness. [IC 16-18-2-7]

Basic life support level of care is defined by the procedures listed in statute. [IC 16-18-2-33.5]
Basic life support organizations provide the following services:

- (1) Assessment of emergency patients.
- (2) Administration of oxygen.
- (3) Use of mechanical breathing devices.
- (4) Application of anti-shock trousers.
- (5) Performance of cardiopulmonary resuscitation.
- (6) Application of dressings and bandage materials.
- (7) Application of splinting and immobilization devices.
- (8) Use of lifting and moving devices to ensure safe transport.
- (9) Administration of epinephrine through an auto-injector.
- (10) Other procedures authorized by the Indiana EMS Commission, including procedures contained in the Revised National Emergency Medical Technician Basic Training Curriculum Guide.

Thus, organizations employing an advanced EMT or paramedic are advanced life support organizations, and organizations employing EMTs certified in basic life support are basic life support organizations.

Organizations. There are 796 EMS services provider organizations in Indiana, as seen in Table 1. While Table 1 shows the level of services provided by the organizations, there are primarily five types of entities that provide prehospital or EMS services in Indiana. Descriptions of the different EMS services providers are provided below. Results from a survey LSA sent to all Indiana counties are used to provide additional information. Responses were received from 57 of the 92 Indiana counties.

Table 1. Certified EMS Providers

Provider Level	Number	Percent
Basic Life Support Nontransport	418	52.5%
Paramedic Organization	188	23.6%
Ambulance Service Provider	102	12.8%
EMT Basic-Advanced Organization	33	4.1%
EMT Basic-Advanced Organization Nontransport	21	2.6%
Rotocraft Air Ambulance	13	1.6%
Paramedic Organization Nontransport	10	1.3%
Rescue Squad Organization	5	0.6%
EMT Intermediate Organization	3	0.4%
Fixed Wing Air Ambulance	3	0.4%
EMT Intermediate Organization Nontransport	0	0.0%
Total	796	100.0%

Source: (10)

[See Appendix A for a map of the responding counties and the survey questions.]

- 1. EMS-Only, Ambulance or Paramedic Services.** An EMS-only organization may be an ambulance services provider or paramedic services organization. These organizations engage in emergency services for the transportation and care of patients, and they provide only prehospital services or medical transportation services, as opposed to providing fire or law enforcement services in addition to EMS services. Of the 57 counties responding to the LSA survey, 40 have EMS-only services organizations providing EMS services within their boundaries, and in 15 counties EMS-only organizations are the sole EMS services provider type.

From the survey results, the majority of EMS-only services are governmental entities that primarily provide advanced life support level of care. The primary sources of revenue for EMS-only services are local taxes and billing of patients (or insurance companies) for services.

Table 2. Details of EMS-Only Services in Indiana

EMS-only Services	Advanced Life Support	Basic Life Support	Intermediate Life Support*	Total
Governmental	15	2	1	18
For-profit	11	-	-	11
Nonprofit	10	1	-	11
Total	36	3	1	40

*The Intermediate Life Support level of care has been repealed.

Source: LSA Survey of Local EMS Systems, 2014.

2. **Fire Departments.** In Indiana, fire departments are either volunteer or career organizations. In the survey of Indiana counties, 31 of the 57 counties responded that fire departments provide EMS services within the county, and in 5 of those counties fire departments are the exclusive providers of EMS services. As seen in Table 3, volunteer fire departments tend to be basic life support organizations, while career fire departments often provide advanced life support level of care. In the sample from the survey, most of the fire departments within the responding counties are volunteer organizations. One implication is that while counties are covered for EMS services response, the service level is more basic.

Most fire departments are funded with local taxes and by billing for services. However, 18 of the 31 counties reported that fire department EMS services are also supplemented with fundraisers or donations.

Table 3. Characteristics of Fire Departments Providing EMS Services in Indiana

Fire Department	Advanced Life Support	Basic Life Support	Total
Career	9	2	11
Volunteer	4	16	20
Total	13	18	31

Source: LSA Survey of Local EMS Systems, 2014.

3. **Hospitals.** In addition to providing in-facility services and being the sponsoring hospital for other EMS services, some hospital or hospital systems provide EMS services or “in the field” services directly. In 19 of the surveyed counties, hospitals provide EMS services, and in 2 counties hospitals are the exclusive providers of EMS services. In all cases, hospitals provide advanced life support level of care although they have different corporate structures.

The majority of hospitals are nonprofit or for-profit entities. The majority of these EMS services providers are funded with local taxes, billing for services, or with fee revenue.

Table 4. Hospital-based EMS Services

	Advanced Life Support
For-profit	6
Governmental	2
Nonprofit	11
Total	19

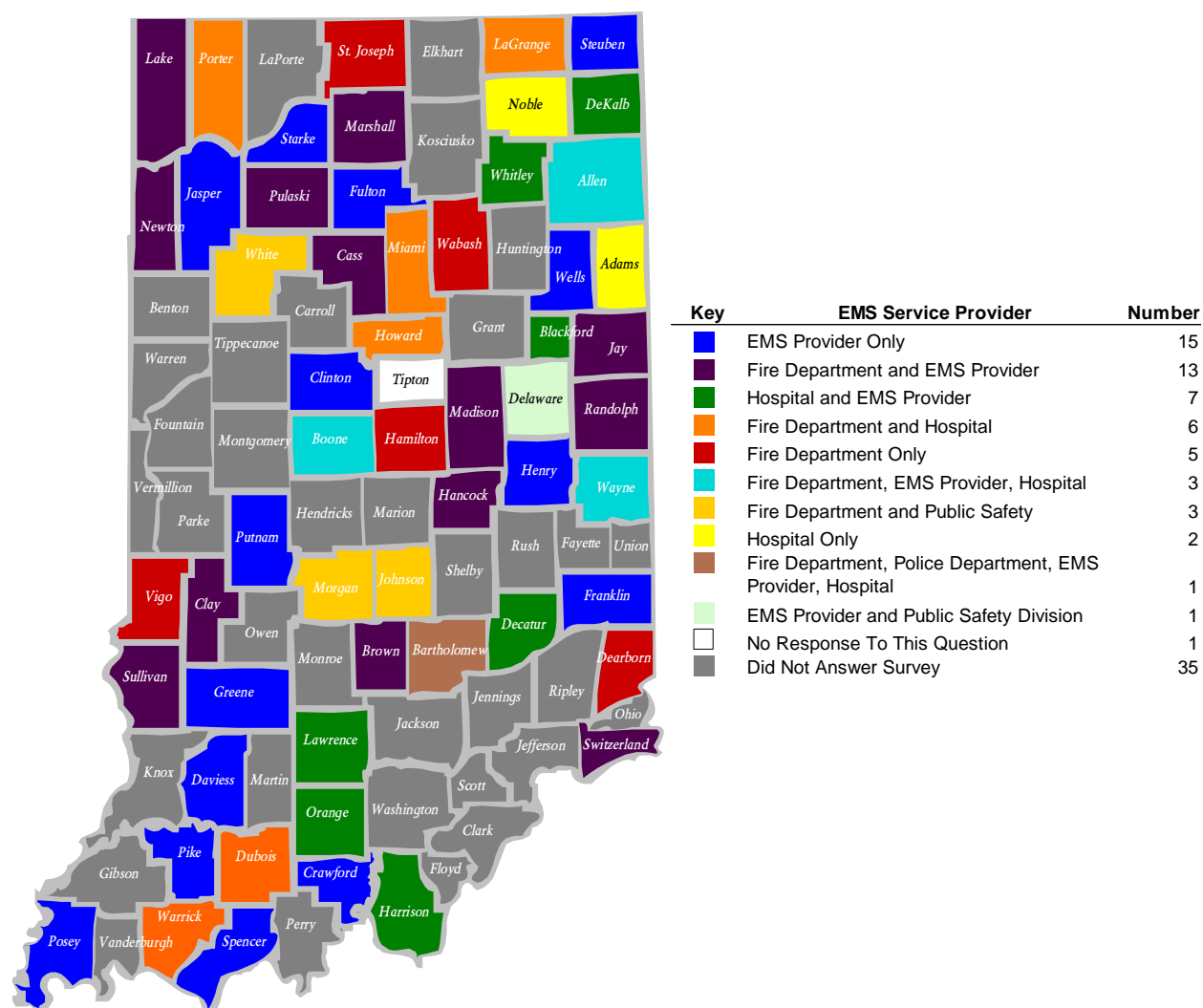
Source: LSA Survey of Local EMS Systems, 2014.

4. **Law Enforcement Departments.** Only one of the 57 counties responding to the survey has a law enforcement department providing EMS services, and this agency provides basic life support.
5. **Public Safety Departments.** Public safety departments combine law enforcement and fire services into one agency. Four of the 57 counties surveyed have public safety departments providing EMS services, and 3 of the agencies provide advanced life support level of care.

Several prehospital services providers may operate within the same jurisdiction. The organizations within the jurisdiction may or may not provide the same level of care or the same services. For instance, one organization within a jurisdiction may be certified as a basic life support service provider and another is an advanced life support organization. In another example, firefighters arriving on a fire truck may stabilize a patient (assessment and prehospital treatment), and then an ambulance service provider transports the patient to a hospital. In several of the counties that replied to the LSA survey, a fire department responds to every emergency and the county has a contract for EMS services with an EMS-only or hospital provider, as well.

In the survey of the counties, LSA found that there are many combinations of types of EMS services providers within each county, as seen in Figure 3. Overall, the counties reported that EMS services are provided most often by EMS-only providers and fire departments. Homeland Security estimates, that statewide, 75% of the EMS services providers are fire departments. (25) The limited sample from the survey data seems to indicate that EMS-only providers and hospitals are also significant EMS service providers in Indiana. Comments from one county indicate that as hospitals purchase existing community hospitals, more EMS services are being provided by the hospital.

Figure 6. EMS Services Providers



Source: LSA Survey of Local EMS Systems, 2014.

Coverage. EMS services are vehicle-based to the extent that the equipment on the vehicle and the configuration of the vehicle limit the services available, in addition to the training and certification of the personnel. Indiana is among 13 states that have over 2,500 certified EMS vehicles. (11, p.69) While this number of vehicles puts Indiana among the states with the highest number of certified vehicles, the distribution of vehicles may have significant impact on the response available in a geographic area. General transportation services, which are estimated by Homeland Security based on services providers' assessments to be as much as 70% of an EMS services organization's responsibility (16), may take emergency vehicles out of an area for a period of time, leaving that area uncovered. Further, the majority of the certified organizations in Indiana are basic life support nontransport organizations.

The LSA survey asked about demand for EMS services in the respondent's county compared with counties of similar population, geographic size, and amount of urbanization. The respondents were asked to provide their own comparisons. Thirteen counties estimated that they had higher demand than similar counties for all three criteria. Eight more counties indicated that they had more demand for EMS services based on at least one of the three criteria. The responses as to why a county has more demand than a similar county indicate that size of the population or the recent growth in population has affected demand. Other frequent explanations include interfacility transport and tourism or the influx of visitors at various times of the year for resorts or other amenities.

Also, the LSA survey results indicate that mutual aid agreements are one way in which emergency response is available at the level and in a timely manner, as needed. The counties were asked how frequently emergency responders or emergency transport providers respond to calls outside of the boundaries of their primary service area, and how frequently emergency medical responders and transporters from other areas respond to calls in their counties. Most indicated that they frequently respond outside of their area as part of mutual aid agreements. Some indicated that it was a matter of having resources in one area that are absent in another.

Table 5. Frequency of Response

Response Responder - Area	Often (weekly or monthly)	Sometimes (3 or 4 times a year)	Rarely or Never (anything less than 3 times a year)
Emergency responders - outside service area	29	23	4
Emergency transporters - outside service area	24	21	11
Other units - inside service area	19	21	15

Source: LSA Survey of Local EMS Systems, 2014.

Transport. In 2008, EMS Commission was required by state statute to adopt a rule concerning the transport of trauma patients. [IC 16-31-2-7] The rule was adopted in 2012. The rule requires an assessment of the condition of the patient using a field triage decision scheme to determine the appropriate transport destination. If the scheme recommends transport to a trauma center, the patient should be transported to a trauma center, unless it would take more than 45 minutes to reach a trauma center or, in the opinion of the responder, the patient's life would be endangered. If the field triage decision scheme indicates that a trauma center is not necessary, the transport should be to the nearest trauma center or to an appropriate hospital under the provider's protocol. Any patient not sorting into one of the other categories may be transported to a trauma center if the provider's protocols permit it. [836 IAC 1-2.1-4]

The EMS Branch in Homeland Security says the office has begun to develop an EMS Strategic Plan for the state, with a final draft delivery date of September 30, 2014. The EMS Branch is conducting forums around the state to receive input from local stakeholders. (16) The output of the strategic plan was not indicated.

Emergency Medical Services Personnel. There are several levels of skilled workers who provide emergency medical services. The statutory definitions of each level are set in IC 16-18-2:

- A. An emergency medical responder (EMR) is an individual who meets the EMS Commission's standards for emergency medical responder certification. An EMR is a first responder to an incident requiring emergency medical services.
- B. An emergency medical technician (EMT) is an individual who is certified to provide basic life support at the scene of an accident, illness, or during transport.
- C. An advanced EMT is certified by the EMS Commission and can perform at least one procedure but not all the procedures of a paramedic. An advanced emergency medical technician has completed a prescribed course in advanced life support and is associated with a single supervising hospital and a provider organization.
- D. A paramedic is affiliated with a certified paramedic organization and employed by a sponsoring hospital approved by the EMS Commission or by a supervising hospital with a contract for in-service education with a sponsoring hospital approved by the EMS Commission. A paramedic has completed a prescribed course in advanced life support and is licensed by the EMS Commission.

Certification. Referring to Table 6, most certified emergency medical personnel in Indiana are EMT or basic EMT. With this distribution of certifications, Indiana is above the national average and the national median for the number of basic-level emergency personnel per state. Also, there are 4,010 paramedics, putting Indiana in a comparable range for the number of paramedics with Kentucky, Tennessee, and Wisconsin. (11, p.92) Indiana is also similar to the average number of paramedics per state nationwide and higher than the median number of paramedics per state⁵. (11, p.90) However, overall, Indiana has fewer EMTs with more advanced training (either at the intermediate or advanced level). As a result, the emergency medical services coverage in Indiana may be at a more basic level of care than other states.

Table 6. Certified Emergency Personnel, Indiana and United States

Certified Emergency Personnel	Indiana Count on 2/7/2014	United States	
		Average	Median
EMT – Basic	19,093	11,410.0	6,605
Emergency Medical Responder	5,493	3,707.4	2,000
Paramedic	4,010	4,246.0	2,154
EMT – Basic-Advanced	1,265		
Temporary	226		
EMT – Intermediate	157	1,275.7	690
EMT – Advanced	52		
Total	30,296		

Source: (10), (11, p.90)

In 2012 legislation, the intermediate and basic-advanced EMT certification levels were repealed, and the levels detailed above were established. [P.L. 77 of 2012] The basic-advanced and intermediate EMT are no longer recognized in Indiana as of July 1, 2014. [Emergency Rule LSA Document #12-393(E)] Basic-advanced and intermediate EMTs have had the opportunity to enroll in bridge courses to achieve the next-highest level of certification, which would be advanced EMT. As shown in Table 6, there are an estimated 1,422 EMTs currently certified in Indiana⁶ who will need to be certified at another level. There is also a comparatively small number of advanced EMTs. It appears that the advanced level of certification was begun in 2013, and it is unknown if this category will rapidly increase in number the closer it is to the July 1, 2014, deadline.

The cost to “train up” is estimated at about \$500 for EMT status and about \$3,000 to \$4,000 for paramedic status. (25) The ISDH provided \$50,000 in funding from rural health funds for Homeland Security to defray the cost of training the EMTs with an expiring designation. Homeland Security was unable to secure a vendor for the training, and the funding was returned to ISDH. (4)(18)

Retention and Recruiting. The LSA survey of counties asked an open-ended question about any difficulties in retaining or recruiting emergency medical personnel. Four counties indicated they had no difficulties retaining or recruiting emergency medical personnel, and 20 did not respond. Of the 30 counties that indicated difficulties retaining or recruiting emergency medical personnel, compensation was identified most often as a factor (25 counties). Finding an adequate number of volunteers was mentioned by 6 counties – either as a result of the age of the county’s population or in relation to the costs of training and equipment associated with being a volunteer emergency medical personnel. Also, 6 counties mentioned the time commitment and cost of training required in comparison to the compensation or volunteer status of many emergency medical personnel.

Volunteers Providing Services. In another question on the LSA survey, respondents estimated the number of emergency medical services responders in their county, both career and volunteer, and the percentage of those that are volunteers. There are an estimated 4,980 emergency medical responders in 43 counties,⁷ with 2,870 (58%) estimated to be volunteers. The respondents in 43 counties also estimated that EMS

⁵ The number of paramedics per capita or geographic area is not available in the data. This would be a preferable statistic to compare states since the coverage by EMTs and paramedics is the important question.

⁶ Note: Personnel who are licensed or certified in Indiana may be crossing over from an adjacent state.

⁷ Data from 11 counties was incomplete as to the estimate of percentage of volunteers, the total number of emergency medical services responders, or both.

services providers respond to a total of 218,227 EMS incidents a year. Based on the respondents' estimates, 88,432 (40.5%) EMS incidents were answered by volunteers.

Nationwide, the percentage of volunteer EMS services providers is about 47%, and in the Midwest the rate is about 65%. Additionally, rural areas tend to have a higher percentage of volunteers. (24, p.21) The sample response from the survey of Indiana counties seems to confirm the national results. With lower call volumes and lower pay in rural areas, the reliance on a volunteer workforce is significant. (24, p.24) Thus, the recruiting, retention, and training of volunteers to provide EMS services must be factored into the discussion of EMS services personnel in Indiana.

Indiana State Agencies with EMS and Trauma System Responsibility

All of the facilities and personnel of the EMS and trauma system are administered by either the ISDH or the EMS Commission, and in many cases both agencies have statutory responsibility for the providers. In addition, the Professional Licensing Agency (PLA) has a role as the Medical Licensing Board licenses physicians who are medical directors and emergency room or acute care physicians in the EMS and trauma system. Figure 6 illustrates the functions performed by the licensing and regulatory state agencies. The figure also shows that the medical director is responsible for oversight and is the primary regulator of the facilities and personnel they serve. As well, supervising hospitals oversee training for EMS services providers and personnel. More details about the administrative and oversight roles are provided below.

Figure 7. Regulation of Primary EMS and Trauma Providers by State Agencies and Others

	Indiana State Department of Health	Indiana Department of Homeland Security Fire Marshal EMS Division EMS Commission	Professional Licensing Agency
Medical Director		Receives	Licenses
Supervising Hospital	Licenses, Inspects	Designates	
EMS Services Provider		Licenses, Trains, Regulates	
EMS Services Personnel		Licenses, Trains, Regulates	
EMS Vehicles		Licenses, Trains, Regulates	
Trauma Centers, Emergency Rooms*	Licenses, Designates	Designates	Licenses

*Trauma Centers are verified by the American College of Surgeons in addition to the state agencies' roles of licensing and designating.

Regulation of Medical Directors. As a licensed physician, the medical director is licensed and regulated by the Medical Licensing Board, which is administered by the PLA. The name of the medical director and the protocols and standing orders of the medical director are filed by the provider organization with the EMS Commission through the EMS Division within Homeland Security. A medical director sets the policy and standing orders for EMS services personnel. The local medical director also reviews trauma incident events and sanctions some types of improper behavior. (More severe cases are investigated by the state.)

Regulation of Hospitals. The ISDH licenses and inspects hospitals (including the emergency department) through its Division of Acute Care. However, hospitals apply to and are granted sponsoring hospital or supervising hospital designation for oversight of paramedics' status by the EMS Commission.

For the designation of a trauma center as "in the process", the application is available on the EMS Commission website. The EMS Commission receives the application and forwards it to the ISDH. The Indiana State Trauma Care Committee at ISDH reviews and makes recommendations to the EMS Commission to approve the trauma center to the "in the process" status.

Regulation of EMS Services Providers. An EMS services provider organization must be certified by EMS Commission to provide emergency services. Also, the organization must have a medical director, with the medical director's policy and standing orders on file with EMS Commission.

In addition to an EMS provider organization being certified, each ambulance vehicle must be certified by the EMS Commission and any accidents that occur are to be reported within 10 days to the EMS Commission.

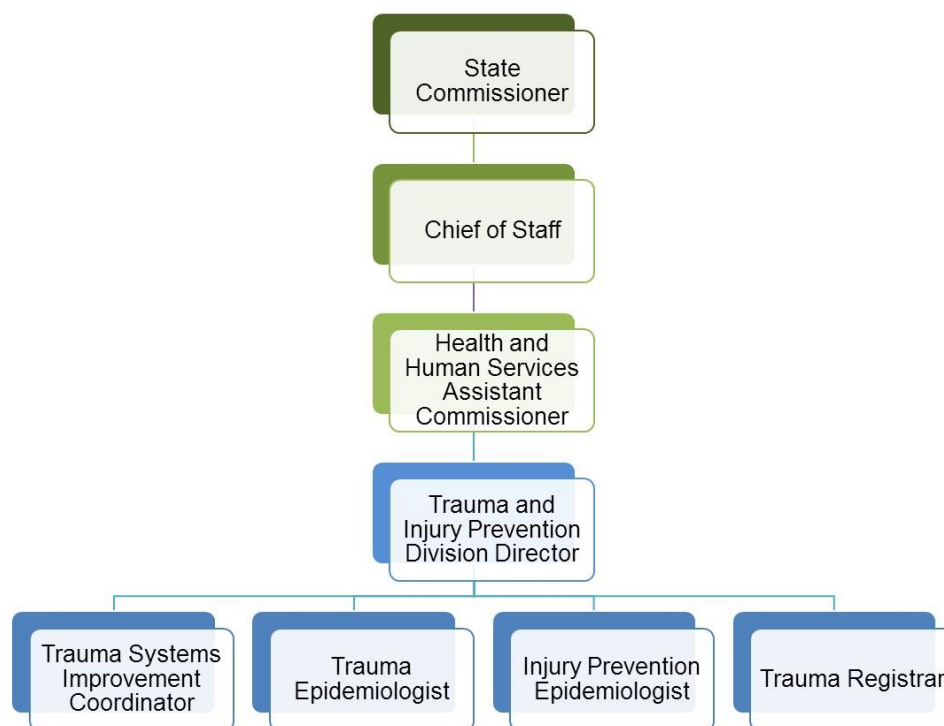
A paramedic provider agency is certified by the EMS Commission to provide advanced life support services administered by paramedics or physicians with an unlimited license to practice medicine in Indiana in conjunction with supervising hospitals. [836 IAC 1-1-1 (11) & (39)]

Regulation of Certified Emergency Personnel. The EMS Commission is responsible for certification or licensing of emergency personnel. The EMS Commission is also responsible for accrediting training programs and certifying supervising hospitals that oversee the personnel from a medical practice view point. The EMS Commission reviews sanctions of emergency personnel when the decisions of the medical director are appealed, and the EMS Commission considers waivers for emergency personnel when requested.

Indiana State Department of Health, Trauma and Injury Prevention Division

The Trauma and Injury Prevention Division is within the Health and Human Services section of ISDH. An assistant commissioner oversees the section, and a director leads the division. The division director is three organizational levels below the State Commissioner, who reports to the Governor. The division is on the same administrative level with other epidemiologically based divisions, such as immunization, women and children's health, and HIV/AIDS, to name a few.

Figure 8. Organization of the Trauma and Injury Prevention Division within the ISDH



Source: ISDH

In addition to the division's five full-time staff, there is a shared medical director within ISDH who is available to the division. The medical director provides medical direction and public health leadership for clinical expertise, oversight, and policy leadership. For example, the medical director is helping the division prepare a report for the Legislative Council suggesting treatments for posttraumatic stress disorder and traumatic brain injury-stricken veterans returning from Afghanistan and Iraq.

The division staff's primary duty has been development of the Trauma Registry. Data collection for problem identification and system improvement is consistent with the public health approach that national organizations advocate.

Other divisions of ISDH provide services that support the charge of the division. The Division of Acute Care licenses hospitals, and the rural health program has provided funding for programs that address a lack of trauma services in rural areas of Indiana.

Division Funding. The division has received funding through federal grants to the ISDH and the Indiana Criminal Justice Institute (ICJI). A Preventative Health Block Grant has provided about \$250,000 for salaries, travel, and maintenance fees for the EMS and rehabilitation portion of the Trauma Registry. The division receives about \$170,000 per year from the ICJI. The ICJI funds are used to pay the Trauma Registry maintenance fees and salary and travel expenses.

Legislation was enacted allowing up to 50% of the funds in the Spinal Cord and Brain Injury Fund to be spent on the development of a statewide trauma system. [P.L. 141-2014] The money in the fund comes from a \$0.30 fee on passenger car and motorcycle registrations. The annual fund revenue averages about \$1.6 million, which will make available up to \$800,000 annually for statewide trauma system development, and there is about \$2.1 million available from the June 30, 2013, fund balance. (60)

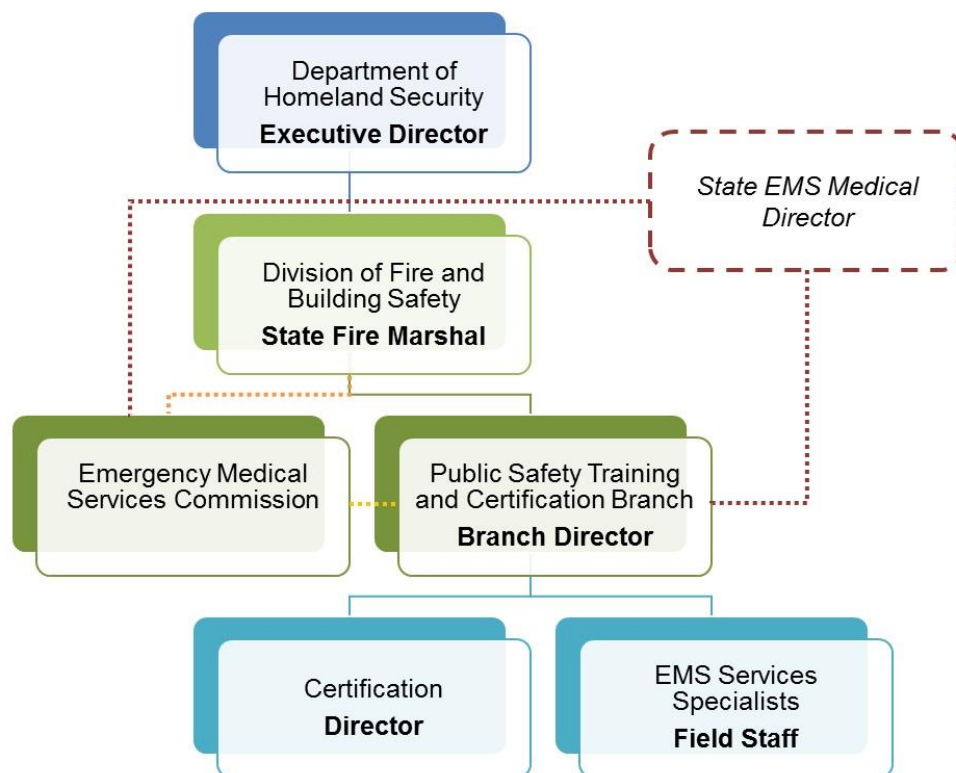
Department of Homeland Security, State Fire Marshal, and Emergency Medical Services Commission

The EMS Commission was established with rulemaking authority in 1974 to develop and promote a statewide program for the provision of emergency medical services. [Added by P.L. 55-1974; original IC 16-1-39-6; current IC 16-31-2-7]

The EMS Commission regulates, inspects, and certifies or licenses the services, facilities, and personnel engaged in providing emergency medical services, under IC 16-31. While the EMS Commission was established as an independent agency in 1974, in 1990 it was incorporated into the State Emergency Management Agency [P.L. 93-1990], and in 2005 that agency was combined into the Department of Homeland Security. In the 2005 legislation, the Division of Fire and Building Safety within the Department of Homeland Security was to administer IC 16-31, which includes the EMS Commission. [P.L.22-2005] However, since the 2005 reorganization, the EMS Commission and the staff assigned to the EMS Commission have been under various divisions within the Department of Homeland Security.

Department of Homeland Security Organizational Structure. Under the organizational structure in place at Homeland Security since about October 2013, the EMS Commission is administered by the Division of Fire and Building Safety under the direction of the State Fire Marshal. A division called the Public Safety Training and Certification Branch and also known as the EMS Branch oversees the EMS districts and provides certification services for the EMS Commission. The State Fire Marshal is appointed by the Governor and works with the executive director of the Department of Homeland Security, who is also appointed by the Governor. The EMS Branch is led by a division director who reports directly to the State Fire Marshal.

Figure 9. Organization of the Indiana Department of Homeland Security, Division of Fire and Building Safety, EMS Training and Certification Branch



Source: Indiana Department of Homeland Security

The EMS Branch staff administers the EMS Commission, providing the licensing and certification, inspecting, and recommending administrative action concerning violations and training requirements. The EMS Commission may review administrative actions taken by the staff upon request of the affected personnel or facility. The certification director and two staff are responsible for certification, compliance, and investigations of certified personnel.

Prior to the current organizational structure, in 2013, Witt and O'Brien, a management consulting firm, prepared a performance evaluation of the Department of Homeland Security at the request of the incoming executive director. The evaluation surveyed Indiana stakeholders. At the time of the review, the EMS Commission's responsibilities were primarily administered by the Preparedness and Training Division, with the field coordination responsibilities handled by the Field Services Division. The survey of stakeholders suggested that EMS services needed to be strengthened.

Respondents suggested that EMS be moved to its own division and have its own director or that it be transferred to ISDH to 'ensure better medical supervision.' There was consensus that EMS in [Homeland Security] was too limited and needed to be better supported. (58, p.44)

In lieu of recommending a transfer of responsibilities to the ISDH or a separate division, the consultants recommended moving the EMS components to the Fire and Building Safety Division. The report also called for ensuring that "staff have appropriate expertise for communication with EMS organizations and personnel as well as implementation of EMS guidance, evaluation, certification, and state-level oversight." (58, p.44)

Emergency Medical Services Commission Configuration and Duties. The EMS Commission has 13 members appointed to four-year terms by the Governor and who come from different agencies and disciplines that are involved in EMS. Under current statute, there is no chairperson or appointing authority for the chairperson in state law. In state law, the EMS Commission has the following primary responsibilities:

- (1) Develop and promote a statewide program for the provision of emergency medical services that includes:
 - a. Emergency ambulance service plans for the state, regional, and local levels.
 - b. Consultative services for state, regional, and local organizations and agencies to develop and implement emergency ambulance service programs.
 - c. Minimum standards, procedures, and guidelines in regard to personnel, equipment, supplies, communications, facilities, and location of a statewide system of emergency medical service facilities.
 - d. Programs to train emergency medical services personnel and to educate the general public in first aid techniques and procedures.
 - e. Coordination of emergency communications, resources, and procedures throughout Indiana.
 - f. A statewide emergency medical services conference to provide continuing education for persons providing emergency medical services.
- (2) Regulate, inspect, and certify or license services, facilities, and personnel engaged in providing emergency medical services.
- (3) Adopt rules required to implement an approved system of emergency medical services and concerning triage and transportation protocols for the transportation of trauma patients consistent with the field triage decision scheme of the American College of Surgeons Committee on Trauma. [IC 16-31-2-7]

The EMS Commission meets about six times a year to consider training and oversight policy, waiver requests (mostly extending training deadlines for personnel in extenuating circumstances), and to oversee disciplinary actions taken by the EMS Branch.

The EMS Commission also has several subcommittees, including the Subcommittee on Training Institution Accreditation, the Subcommittee on Data Collection, and the Narcotics Working Group. The Indiana EMS for Children (EMS-C) was established in 2009 with a federal grant to improve the quality of emergency care for children. The EMS-C reports to the EMS Commission at each meeting. (15) The EMS Technical Advisory Committee (EMSTAC) is established in statute to review and make recommendations on implementation and adoption of rules concerning specific topics assigned to it by the EMS Commission. The EMSTAC members are appointed by the EMS Commission, with approval by the Governor. [IC 16-31-2-10]

State EMS Medical Director. In 2014 legislation, Homeland Security was given authority for a new state EMS medical director position. [P.L. 188 of 2014] The executive director of Homeland Security is to make the appointment with the approval of the EMS Commission. Figure 9 shows the proposed organizational context of the position. The state EMS medical director is expected to oversee the EMS Branch and have a relationship to the EMS Commission.

The statutory duties of the state EMS medical director are to oversee all aspects of prehospital EMS services. The state EMS medical director duties are to include:

- (1) Interfacing or integrating the medical components of statewide planning for trauma, burn, cardiac, and stroke care, domestic preparedness, and EMS for children with the statewide EMS system.
- (2) Establishing statewide model guidelines and best practices for all patient care activities to ensure delivery of medical care consistent with professionally recognized standards, a statewide EMS continuous quality improvement program, and a statewide EMS advocacy program.
- (3) In cooperation with appropriate state and local agencies, training and certification of all EMS providers.
- (4) Assisting the executive director with all issues related to statewide EMS, including consulting with EMS medical directors, providing guidance and assistance on the scope of practice, restrictions on EMS certifications, corrective and disciplinary actions, and education and training issues for EMS personnel, EMS system research, coordination of all medical activities for disaster planning and response, and improving quality of care, research, and injury prevention.

Many of these responsibilities are similar to the statutory authority of the EMS Commission, and the state EMS medical director is to work with the EMS Commission to achieve the goals of the EMS Commission.

Comparing Indiana's Trauma System to Trauma Systems in Other States

Selection of States Four states were selected for review of their state trauma and EMS systems—Washington, Oregon, Minnesota, and Pennsylvania. This section of the report provides a brief history of the EMS and trauma systems, the state and local entities involved in planning and regulating the systems, state funding, and successes and challenges for each state's system.

Washington and Oregon were selected because they are examples of states that have one state agency overseeing the trauma system and EMS. There are also characteristics of these states that are comparable to Indiana, such as population (Washington), the prevalence of volunteer first responders (Washington), and the prevalence of EMS-credentialed professionals working for fire department-based EMS agencies (Oregon).

Pennsylvania is an interesting state to study in terms of their trauma and EMS system's organizational structure. The Department of Health serves as the lead agency for trauma and EMS, but there is a separate entity, a 501(c)(3) foundation, that provides accreditation for the trauma centers. Indiana and Pennsylvania also share a similar prevalence of volunteer first responders and a similar prevalence of 911 response agencies with transport capabilities in what are considered rural areas.

The state selected that is most similar to Indiana regarding the trauma and EMS system is Minnesota. Minnesota's trauma system is located within the Department of Health, while EMS is regulated by a separate entity called the Emergency Medical Services Regulatory Board. Also, Indiana and Minnesota share a similar prevalence of volunteer first responders and a similar prevalence of 911 response agencies with transport capabilities that are considered rural.

Washington State

History of the Trauma System and EMS. In the 1970s, the Washington legislature enacted several laws that affected EMS in the state. The legislative changes included the certification of paramedics by the Washington Department of Social and Health Services (predecessor to the Department of Health) and the University of Washington, the establishment of levels of support personnel with accompanying educational requirements, the establishment of minimum standards for patient care, the requirement for state inspection, and licensure of prehospital EMS providers. Near the end of the decade, legislation was passed to establish eight EMS regions. In 1989, legislation was enacted to create the Washington State Department of Health, and EMS was moved to this new agency. [Revised Code of Washington 43.70]

Washington's comprehensive trauma system began in 1990 when the Washington Emergency Medical Services and Trauma Act of 1990 was passed by the legislature. The impetus for this legislation stemmed from a report that was presented to the legislature that focused on the need for a comprehensive statewide trauma system. This legislation provided for the designation of trauma care facilities, the development of triage criteria, a framework for regional planning and implementation of the system, the development of the trauma registry, the development of quality assurance and improvement programs, the evaluation of the system, and other components. (53, p.4)

The Trauma Care Services Fund Act was passed in 1997, and it established a dedicated fund for the trauma system. This fund supports various components of the trauma system including prehospital support, physicians providing trauma services at designated facilities, and rehabilitation services. [Revised Code of Washington 70.168.040]

In 2010, the Emergency Cardiac and Stroke Care Act was passed, resulting in the establishment of the Emergency Cardiac and Stroke System. The legislation amended the law governing the EMS and Trauma System by requiring the hospitals voluntarily participating in the system to participate in internal and regional quality improvement programs and requiring that they participate in a data collection system that measures performance. [Revised Code of Washington 70.168.150]

Successes. In 2010, the statute governing the EMS and Trauma System was expanded to provide for an Emergency Cardiac and Stroke System to continue improving the comprehensive system. Because the Washington trauma system is well established and the dedicated funding from the Trauma Care Fund will still be available for the reimbursement of trauma care, there is little concern about this expansion diminishing the trauma aspects of the system. (38)

Because the trauma system has been implemented since 1990, there has been data received for the trauma registry dating back to about the time of inception. The number of hospital deaths from traumatic injury has declined to 5% in 2010 from 9% in 1995. Also, the survival of severely injured patients has increased from about 77% in 1995 to about 87% in 2010. (54, pp.2-3)

Challenges. There are challenges facing the trauma system, particularly within the rural areas of the state. (38) Transport times are longer in rural areas, and there is a greater prevalence of volunteer EMS providers in rural areas compared to urban areas in Washington. The volunteer providers may not be equipped to provide advanced paramedic services compared to their paid counterparts. (54, p.4)

Comparison For comparison purposes, there are some similarities between the states of Washington and Indiana. For example, the population of Washington is similar to the population of Indiana. There are also similarities between the two states regarding EMS, which can be seen in Table 7 with the information from the 2011 National EMS Assessment study prepared for the Federal Interagency Committee on EMS.

There are some contrasts between the states when considering local EMS data collection and the involvement of the state EMS office with the state trauma systems. For example, Washington reported having frequent participation with the state EMS office and local EMS data collection, while Indiana reported that their level of participation was “none.” (11, p.151) Also, Washington reported having a frequent level of participation with the state EMS office and trauma center designation and trauma system management, while Indiana reported that there was no participation with the state EMS office concerning trauma center designation and minimal participation concerning trauma system management. (11, pp.150-152)

There are also contrasts when comparing the trauma systems of Washington and Indiana. The organizational framework of the trauma systems and EMS are different in each state. In Washington, there is an Office of EMS and Trauma System that is located in the Washington State Department of Health. Also, Washington's trauma system was enacted in 1990, while the law authorizing the creation of Indiana's trauma system was passed in 2006. Another difference is Washington designates trauma centers as Level I through Level V while Indiana designates trauma centers as Level I through Level III. Finally, Washington provides funding to trauma centers and the EMS system through a dedicated Trauma Care Fund. Recently, the biennial budget for the fund was about \$42 million, consisting of the fees, surcharges and Medicaid match funds. (52) After 2014 legislation goes into effect, the statewide trauma system in Indiana may receive up to \$1.0 million annually from the Spinal Cord and Brain Injury Fund and other sources.

Table 7. Washington and Indiana Comparison

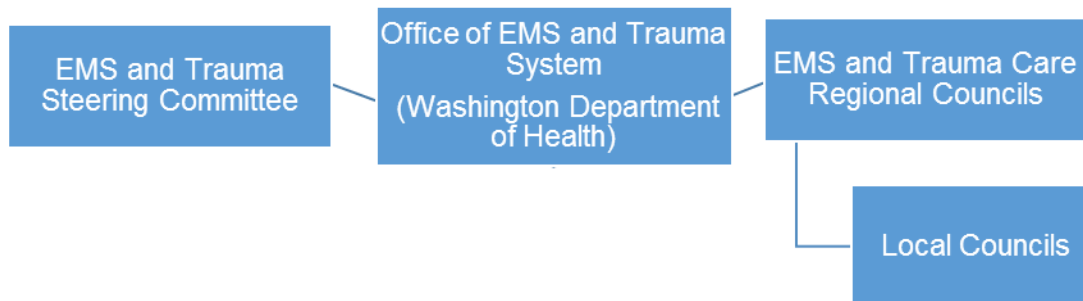
	Washington	Indiana
Population (2010 Census) ⁽⁴⁷⁾	6,971,406	6,483,802
Age Distribution of Population ⁽²¹⁾		
Children 0-8	25%	27%
Adults 19-64	62%	59%
Adults 65 +	13%	15%
Population Distribution by Metropolitan Status ⁽²²⁾		
Metropolitan	93%	73%
Nonmetropolitan	7%	27%
Injury Death Rates per 100,000 Population ^{(7)*}	56.78	59.29
State Funding for Trauma System (Annual)	\$21 M**	\$1.0 M
Selected Metrics from the 2011 National EMS Assessment Study ^(11, pp.12, 44, 69, 90-92, 107, 111, 149, 150-52, 305)		
Total Number of Licensed EMS Agencies	251-500	More than 500
Percentage of First Responders Considered Volunteer	76%-100%	76% - 100%
Percentage of EMS Credentialed Professionals Working for Fire-Based EMS Agencies	1%-25%	26% - 50%
Percentage of 911 Response Agencies in County/Equivalent with Transport Capability Considered Rural	Data unavailable	51% - 75%
Number of Credentialed First Responders	601-2,000	5,001 – 20,000
Number of Credentialed EMT-Basic Professionals	5,001 – 20,000	5,001 – 20,000
Number of Credentialed EMT-Paramedic Professionals	2,001 – 5,000	2,001 – 5,000
Number of Credentialed Vehicles	More than 2,500	More than 2,500
Level of Participation with Local EMS Data Collection	Frequent	None
Level of Participation with Local EMS Technical Assistance	Frequent	Frequent
Level of Participation with Trauma Center Designation	Frequent	None
Level of Participation with Trauma System Management	Frequent	Minimal
State EMS Data System Links with Trauma Registry Data	No	No

* The data sources are the NCHS Vital Statistics System for numbers of deaths and the Census Bureau for population estimates. These figures include all injuries, all intents, all races, all ethnicities, both sexes, all ages and reflect the age-adjusted rate.

**The Trauma Care Fund supports the hospitals, physicians, prehospital, and rehabilitation trauma system services in Washington. The fund consists of surcharges on licensed vehicles and fees for moving violations and assists in securing federal matching funds through Medicaid payments. Recently, the biennial budget for the fund was about \$42 million, consisting of the fees, surcharges, and Medicaid match funds.

Organization of the State Trauma System and EMS. The Office of EMS and Trauma System is located in the Office of Community Health Systems within the Washington State Department of Health in the Health Systems Quality Assurance Division. There is also an EMS and Trauma Care Steering Committee, eight EMS and Trauma Care Regional Councils, and local councils that may be formed by counties.

Figure 10. Organization of the Washington Trauma System and EMS



The Office of EMS and Trauma System is required by law to establish statewide standards for trauma care services and personnel training, establish the number of hospitals and prehospital providers that may provide trauma care services within each region, review and approve regional EMS and trauma care plans, coordinate the statewide EMS and trauma care system, establish a trauma care registry, and administer funding for the EMS and trauma care system. [Revised Code of Washington 70.168.060]

The Department of Health is further required to establish the minimum requirements for EMS vehicles and equipment, establish standards for first responder and EMT training, and provide for the certification of emergency medical program directors. [Revised Code of Washington 18.73.081]

The EMS and Trauma Care Steering Committee consists of 30 members appointed by the Secretary of the Department of Health. The law requires the committee to serve as an advisory body to the Department of Health concerning EMS and trauma care and make recommendations concerning changes in rules governing the system. [Revised Code of Washington 70.168.020]

The EMS and Trauma Care Regional Councils are required by law to develop regional EMS and trauma care plans, as well as consider the needs of EMS and trauma care within their individual regions. They are required to advise the Department of Health on EMS and trauma care delivery within the region. Current law also requires the regional councils to provide data to the Department of Health in order to assist the department in its evaluation of the effectiveness of EMS and the trauma system. [Revised Code of Washington 70.168.100]

Local EMS and Trauma Care Councils may be established by a county or group of counties, and may include EMS providers, individuals involved in hospital and prehospital trauma care, elected officials, local law enforcement, and others involved in the delivery of EMS and trauma care. Local councils are required by law to provide recommendations to the appropriate regional councils concerning the delivery of EMS and trauma care in their respective regions. [Revised Code of Washington 70.168.120] Some local councils may provide personnel training and educational programs for the public. (51)

Table 8. Washington Trauma Centers

Designation of Trauma Center	Adult	Pediatric and/or Rehabilitative Only
Level I	1	3
Level II	6	3
Level III	24	
Level IV	33	
Level V	16	
Total	80	6

Source: (57)

Trauma Centers. Trauma center levels indicate the level of care provided at the facilities. For example, Level I trauma centers provide trauma care services ranging from prevention to rehabilitation, while Level IV trauma centers provide 24-hour physician coverage, resuscitation, and stabilization of trauma patients before they are transferred to a facility that may provide more services. (33, p.2) Trauma center designations I through IV are further explained on page 7 of this report. Level V trauma centers are rural hospitals or clinics providing resuscitation, stabilization, and transfer of trauma patients. (56)

Washington's Department of Health designates trauma centers as Level I through Level V for adult, pediatric, and rehabilitative care. Some trauma centers may have several designations. For example, there is one Level I trauma center for adult care, and this facility is also a designated Level I pediatric trauma center. Table 8 provides the number of trauma centers by level in Washington.

State Funding for the Trauma System and EMS. The Trauma Care Fund supports the hospitals, physicians, prehospital, and rehabilitation trauma system services in Washington. The fund consists of surcharges on licensed vehicles and fees for moving violations and assists in securing federal matching funds through Medicaid payments. (38) Recently, the biennial budget for the fund was about \$42 million, consisting of the fees, surcharges and Medicaid match funds. (52)

Grants are distributed to trauma care system providers from the Trauma Care Fund. Hospital grants totaled about \$4 million for state fiscal year 2014. (55)

Oregon

History of the Trauma System and EMS. During the 1970s and 1980s, the Oregon EMS system began to grow due to federal financial support. The system was bolstered by the passage of the federal Emergency Medical Services Systems Act of 1973. This law provided federal grants to states for the establishment of EMS systems. [Public Law 93-154] Federal legislation enacted in 1984 authorized the use of funding for EMS for Children programs focusing on the improvement of pediatric EMS, and Oregon was one of four states receiving initial funding. (1)

The trauma system in Oregon was developed in the 1980s. In 1984, the Oregon Trauma Plan was presented and included trauma system components such as standards for prehospital care, trauma triage criteria, designation of trauma centers, and quality assurance aspects. Then, in 1985, the Oregon legislature passed Senate Bill 147, which allowed for the creation of a statewide trauma system, including the trauma registry. Senate Bill 147 also created the State Trauma Advisory Board and the Area Trauma Advisory Boards. (35, p.1)

In 2009, there was a re-organization of the Department of Human Services, and the Oregon Health Authority was created. The Oregon Health Authority contains the Office of the State Public Health Director, and the Center for Health Protection is one of three centers located under this office. The Center for Health Protection houses the Healthcare Regulation and Quality Improvement Program, where the EMS and Trauma Systems Program is located.

Successes. Oregon was one of the first states to develop a statewide trauma system and was the first state to include smaller rural hospitals in the system. (35, p.v) One study indicated that the implementation of the trauma system was associated with a decline in the risk of death of injured patients statewide. The same study found that while the number of deaths increased at Level I trauma centers (due to more transfers of high-risk patients compared to pre-implementation), overall, the risk-adjusted odds ratio of death declined. (29)

Another study compared seriously injured patients in Washington and Oregon before the implementation of the Oregon trauma system and after and found that reductions in the risk of death were particularly evident regarding patients with head or liver/spleen injuries after the implementation of the program. (30)

Components of the trauma system that seem to be working well include rapid triage and transfer from referring hospitals, a strong level of commitment from Level I trauma centers, State Trauma Advisory Board, the Area Trauma Advisory Boards, and a functional trauma registry. (9)

Challenges. Twenty-five of the trauma hospitals are Level IV facilities, and it can be difficult for these facilities to devote a substantial amount of resources to the trauma program in terms of having adequate staffing to carry out functions such as conducting performance improvement. These facilities, mostly located in rural areas, do not receive as many trauma cases as the other facilities with higher designated trauma levels. (42)

Comparison. Although Oregon's population is almost half of Indiana's, there are some similarities between the two states relating to EMS, which can be seen in Table 3 with the information from the 2011 National EMS Assessment study prepared for the Federal Interagency Committee on EMS. For example, Oregon and Indiana both reported a similar prevalence (26% to 50%) of EMS credentialed professionals working for fire-based EMS agencies. (11, p.111) Also for both states, the majority of 911 response agencies with transport capability are located in areas considered to be rural. (11, p.44)

There are some contrasts between the states when considering local EMS data collection, the involvement of the state EMS office with the state trauma systems, and trauma registry data. For example, Oregon reported that there was frequent participation with the state EMS office and local EMS data collection, while Indiana reported that their level of participation was "none." (11, p.151) Oregon reported having a frequent level of participation with the state EMS office and trauma center designation, while Indiana reported that

there was no participation with the state EMS office concerning trauma center designation. (11, p.152) Also, Oregon's state EMS data system was reported to link with the trauma registry data, while it was reported that Indiana's EMS data does not. (11, p.305)

There are also contrasts when comparing the trauma systems of Oregon and Indiana. The organizational framework of the trauma systems and EMS are different in each state. The Oregon Health Authority contains the Office of the State Public Health Director, and the Center for Health Protection is one of three centers located under this office. The Center for Health Protection houses the Healthcare Regulation and Quality Improvement Program, where the EMS and Trauma Systems Program is located. Also, Oregon's trauma system was enacted by legislation in 1985, while the law authorizing the creation of Indiana's trauma system was passed in 2006. Further, for the most recent biennial budget (2013-2015), the projected revenues for the EMS and Trauma Program were about \$4.1 million in Oregon.) After 2014 legislation goes into effect, the statewide trauma system in Indiana may receive up to \$1.0 million annually from the Spinal Cord and Brain Injury Fund and other sources.

Table 9. Oregon and Indiana Comparison

	Oregon	Indiana
Population (2010 Census) ⁽⁴⁵⁾	3,930,065	6,483,802
Age Distribution of Population ⁽²¹⁾		
Children 0-8	24%	27%
Adults 19-64	62%	59%
Adults 65 +	14%	15%
Population Distribution by Metropolitan Status ⁽²²⁾		
Metropolitan	77%	73%
Nonmetropolitan	23%	27%
Injury Death Rates per 100,000 Population ^{(7)*}	60.80	59.29
State Funding for Trauma System (Annual)	\$2.05 M**	\$1.0 M
Selected Metrics from the 2011 National EMS Assessment Study (11, pp.12, 44, 69, 90-92, 107, 111, 149, 150-52, 305)		
Total Number of Licensed EMS Agencies	1-150	More than 500
Percentage of First Responders Considered Volunteer	26% - 50%	76% - 100%
Percentage of EMS Credentialed Professionals Working for Fire-Based EMS Agencies	26% - 50%	26% - 50%
Percentage of 911 Response Agencies in County/Equivalent with Transport Capability Considered Rural	More than 75%	51% - 75%
Number of Credentialed First Responders	1-600	5,001 – 20,000
Number of Credentialed EMT-Basic Professionals	601-2,000	5,001 – 20,000
Number of Credentialed EMT-Paramedic Professionals	1-600	2,001 – 5,000
Number of Credentialed Vehicles	501-1,000	More than 2,500
Level of Participation with Local EMS Data Collection	Frequent	None
Level of Participation with Local EMS Technical Assistance	Frequent	Frequent
Level of Participation with Trauma Center Designation	Frequent	None
Level of Participation with Trauma System Management	Minimal	Minimal
State EMS Data System Links with Trauma Registry Data	Yes	No

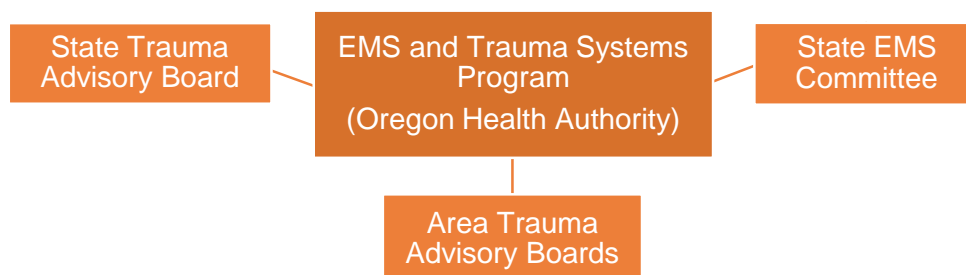
* The data sources are the NCHS Vital Statistics System for numbers of deaths and the Census Bureau for population estimates. These figures include all injuries, all intents, all races, all ethnicities, both sexes, all ages and reflect the age-adjusted rate.

**For the most recent biennial budget (2013-2015), the projected revenues for the EMS and Trauma Program were about \$4.1 million. This includes revenue from fees for EMT testing, certification, and renewals of certifications, fees for ambulance licensing, and other state and federal funds. The final budgeted expenditure amounts were about \$3.7 million from funds other than the General Fund and federal funds, and about \$0.3 million from federal funds.

Organization of the State Trauma System and EMS. The Oregon Health Authority contains the Office of the State Public Health Director, and the Center for Health Protection is one of three centers located under this office. The Center for Health Protection houses the Healthcare Regulation and Quality Improvement Program, where the EMS and Trauma Systems Program is located. The law charges the EMS and Trauma Systems Program with the responsibility for regulating ambulances, providing training for EMS providers,

maintaining the Oregon Trauma Registry, and providing for quality assurance. The director of the program is required to develop standards of care for the state and the regions, develop educational curriculum in order to provide information about the standards of care, provide quality improvement programs, and provide a prehospital care data system. [Oregon Revised Statute 431.623]

Figure 11. Organization of the Oregon Trauma System and EMS



The State Trauma Advisory Board was established to serve as an advisory body for the trauma program. The rules governing the trauma program require the State Trauma Advisory Board to provide advice to the Public Health Division regarding the adoption of regulations for the trauma system, and to analyze data concerning injury prevention. The board is required to have at least 17 members and consist of representatives from the Area Trauma Advisory Boards. [Oregon Administrative Rules 333-200-0030 and 333-200-0035]

There are seven trauma regions in Oregon, and each region has an Area Trauma Advisory Board. The Area Trauma Advisory Boards are required to devise area trauma system plans that are submitted to the Oregon Health Authority. Members of the board are selected by the Oregon Health Authority, should be representative of the trauma region, and must contain at least 15 members. [Oregon Revised Statute 431.613]

There is also a State EMS Committee that serves as an advisory body to the Oregon Health Authority concerning EMS administrative rules and assists with the coordination and planning of EMS at the state and regional levels. Current law provides that the committee consist of 18 members. [Oregon Revised Statute 682.039]

Table 10. Oregon Trauma Centers

Designation of Trauma Center	Count
Level I	2
Level II	4
Level III	13
Level IV	25
Total	44

Source: (36)

Trauma Centers. Trauma center levels indicate the level of care provided at the facilities, with Level I trauma centers providing the most comprehensive care. Trauma center designations I through IV are further explained on page 7 of this report.

The Oregon Health Authority designates trauma centers as Level I through Level IV. Table 10 provides the count of trauma centers by level of designation.

State Funding for the EMS and Trauma System. For the most recent biennial budget (2013-2015), the projected revenues for the EMS and Trauma Program were about \$4.1 million. This includes revenue from fees for EMT testing, certification, and renewals of certifications, fees for ambulance licensing, and other state and federal funds. The final budgeted expenditure amounts were about \$3.7 million from funds other than the General Fund and federal funds and about \$0.3 million from federal funds. (8)

Minnesota

History of the Trauma System and EMS. The eight EMS regions in Minnesota were established in the 1970s due to federal funding support, and they are still in existence. In 1985, the legislature established the Emergency Medical Services Fund to provide state financial support to the regions and also support statewide projects. In order to receive funding, the regions are required to provide support for local and regional EMS, focusing on trauma and cardiac care. (27, p.16)

The Emergency Medical Services Regulatory Board was created in 1995 through legislation. State regulation of EMS was transferred from the Minnesota Department of Health to the board. (41) The creation of an independent board tasked with regulating EMS occurred as a result of lobbying by ambulance providers. (27, p.7)

In 2003, the current trauma system began to be developed when a committee was charged by the Commissioner of Health with establishing a comprehensive trauma system plan and identifying weaknesses with the system at that time. (2, p.6) Surveys were conducted and demonstrated existing barriers to participation in the trauma system from rural hospitals. A draft plan was completed and pilot tests were conducted, eventually leading to the legislation establishing the trauma system in 2005. (2, pp.15-16) The current system focuses on the needs of rural areas and the necessity of inclusion of these areas and hospitals within the system.

Successes. Minnesota's trauma system has been successful in including rural hospitals. In particular, this is demonstrated with the offering of trauma educational programs at different venues and the offering of a course led by family physicians that has provided a traveling trauma skills module. Minnesota was the first state to provide advanced trauma life support courses in rural areas. (28, p.12) Efforts such as these assist rural facilities with meeting the standards of the trauma program.

Although performance improvement activities have not yet begun in earnest statewide,⁸ there have been anecdotal reports of trauma centers receiving patients sooner and in better condition compared to the timing and conditions of the patients before the implementation of the trauma system. (39)

Challenges. In recent years, Minnesota has experienced difficulty obtaining EMS data from ambulances. Because this data is submitted to the EMS Regulatory Board, the trauma system does not have control over the quality or accuracy of the data. Also, the statute creating the EMS registry specifies that the data cannot be shared. Although the trauma system was receiving this data, they were not allowed to share the data with hospitals due to the law. The trauma system has not received this data for almost three years. (39)

Comparison. There are some similarities between Minnesota and Indiana relating to EMS, which can be seen in Table 11 with the information from the 2011 National EMS Assessment study prepared for the Federal Interagency Committee on EMS. For example, Minnesota and Indiana both reported a similar prevalence (76% to 100%) of first responders considered to be volunteer. (11, p.107) Also for both states, the majority of 911 response agencies with transport capability are located in areas considered to be rural. (11, p. 44)

⁸ The Southern Minnesota Regional Trauma Advisory Committee has started a performance improvement process.

Table 11. Minnesota and Indiana Comparison

	Minnesota	Indiana
Population (2010 Census) ⁽⁴⁴⁾	5,303,925	6,483,802
Age Distribution of Population ⁽²¹⁾		
Children 0-8	26%	27%
Adults 19-64	61%	59%
Adults 65 +	14%	15%
Population Distribution by Metropolitan Status ⁽²²⁾		
Metropolitan	75%	73%
Nonmetropolitan	25%	27%
Injury Death Rates per 100,000 Population ^{(7)*}	50.95	59.29
State Funding for Trauma System (Annual)	\$0.35 M	\$1.0 M
Selected Metrics from the 2011 National EMS Assessment Study (11, pp.12, 44, 69, 90-92, 107, 111, 149, 150-52, 305)		
Total Number of Licensed EMS Agencies	251-500	More than 500
Percentage of First Responders Considered Volunteer	76% - 100%	76% - 100%
Percentage of EMS Credentialed Professionals Working for Fire-Based EMS Agencies	1%-25%	26% - 50%
Percentage of 911 Response Agencies in County/Equivalent with Transport Capability Considered Rural	51-75%	51% - 75%
Number of Credentialed First Responders	5,001-20,000	5,001 – 20,000
Number of Credentialed EMT-Basic Professionals	5,001 – 20,000	5,001 – 20,000
Number of Credentialed EMT-Paramedic Professionals	5,001-20,000	2,001 – 5,000
Number of Credentialed Vehicles	501-1,000	More than 2,500
Level of Participation with Local EMS Data Collection	Frequent	None
Level of Participation with Local EMS Technical Assistance	Frequent	Frequent
Level of Participation with Trauma Center Designation	Frequent	None
Level of Participation with Trauma System Management	None	Minimal
State EMS Data System Links with Trauma Registry Data	No	No

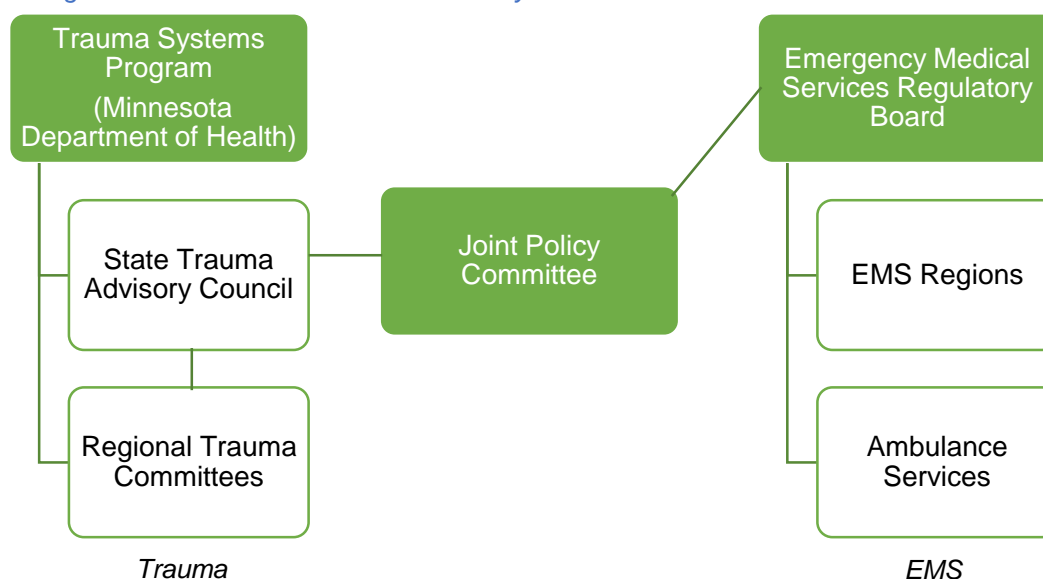
* The data sources are the NCHS Vital Statistics System for numbers of deaths and the Census Bureau for population estimates. These figures include all injuries, all intents, all races, all ethnicities, both sexes, all ages and reflect the age-adjusted rate.

There are some contrasts between the states when considering local EMS data collection and the involvement of EMS with the state trauma systems. For example, Minnesota reported having frequent participation with the state EMS office and local EMS data collection, while Indiana reported that their level participation was “none.” (11, p.151) Both states require data submission from local EMS agencies. (11, p.291) Also, Minnesota reported having a frequent level of participation with the state EMS office and trauma center designation, while Indiana reported that there was no participation with the state EMS office and this function. (11, p.152) This is particularly interesting because both states have separate agencies overseeing the trauma system and EMS.

There are some similarities between the trauma systems of Minnesota and Indiana. Both Indiana and Minnesota have relatively new trauma systems, and the trauma systems and EMS are housed and regulated by separate state entities. However, the level of funding for Minnesota’s trauma system is less than the level of funding for Indiana’s trauma system. In Minnesota, state funding for the trauma system is about \$350,000 annually. After 2014 legislation goes into effect, the statewide trauma system in Indiana may receive up to \$1.0 million annually from the Spinal Cord and Brain Injury Fund and other sources.

Organization of the State Trauma System and EMS The Trauma Systems Program is housed in the Office of Rural Health and Primary Care under the direction of the Minnesota Department of Health. In addition, there is a State Trauma Advisory Council and Regional Trauma Advisory Committees that assist in the coordination and activities of the trauma system. There is a separate board—the Emergency Medical Services Regulatory Board—that regulates EMS in Minnesota. A Joint Policy Committee was established in 2008 to improve coordination between the EMS Regulatory Board and the statewide trauma system. There are also eight EMS regions that assist in the coordination of EMS and trauma in Minnesota, and they receive funding from the EMS Regulatory Board.

Figure 12. Organization of the Minnesota Trauma System and EMS



The administrative location of the Trauma Systems Program in the Office of Rural Health and Primary Care demonstrates the importance of rural systems within the program. Because Minnesota is a very rural state, it is essential that rural hospitals are included as stakeholders in the development and collaboration of the system.

The State Trauma Advisory Council, an advisory body for the Department of Health, consists of 15 members, including the State Medical Director of the EMS Regulatory Board. The council has made several recommendations regarding the trauma system including the designation of trauma centers. (2, p.13)

Regional Trauma Advisory Committees are charged by statute to develop and implement trauma plans within their designated region, including trauma triage and transport guidelines. The regional committees are also required to make recommendations to the State Trauma Advisory Council concerning modifications to statewide trauma criteria that would improve patient care. The current law allows for up to eight regional committees to be established (there are currently six), and approval is obtained through the State Trauma Advisory Council. (28, p.18) Regional committees may have no more than 15 members. Members are designated by the Commissioner of Health after conferring with the EMS Regulatory Board.

The Joint Policy Committee consists of three members from the State Trauma Advisory Council and the EMS Regulatory Board and is an advisory body to both of these entities. (28, p.13)

The EMS Regulatory Board is responsible for certifying EMS personnel, developing triage and transportation guidelines for the trauma system, distributing financial support to the eight EMS regions, regulating ambulance services, and investigating complaints regarding the EMS system. The board is responsible for a database that includes data on ambulance runs. (2, pp.7,12,13) In addition, the law requires the board to adopt rules that define primary service areas so they may designate ambulance services to operate in the primary service areas. [2013 Minnesota Statutes, Section 144E.06]

Statute provides that the EMS regions have boards that consist of appointed representatives from each county in the region, as well as representatives of EMS organizations located in the region. The financial support distributed to the eight EMS regions may be used for the support of local and regional EMS, particularly focusing on trauma and cardiac care. [2013 Minnesota Statutes, Section 144E.50]

Table 12. Minnesota Trauma Centers

Designation of Trauma Center	Count
Level I	5
Level II	5
Level III	30
Level IV	86
Total	126

Source: (39)

designations. For example, three of the adult Level I trauma centers also have a Level I pediatric designation. Table 12 provides the number of trauma centers by level.

Trauma Centers Trauma center levels indicate the level of care provided at the facilities, with Level I trauma centers providing the most comprehensive care. Trauma center designations I through IV are further explained on page 7 of this report.

Minnesota's Department of Health designates trauma centers as Level I through Level IV for adult and pediatric care. Some trauma centers may have several

State Funding for the Trauma System. Funding for the trauma system comes from the General Fund. The funding is generated from dedicated fees on all licensed hospitals in the state. Fees paid by the hospitals consist of a flat fee and fees based on the number of beds in the hospitals. There are application fees for trauma designation, but there are no site visit fees assessed. State funding for the trauma system is about \$350,000 annually. (39)

State Funding for EMS. The legislature appropriated about \$2.7 million from the General Fund to the EMS Regulatory Board each year during the 2014-2015 biennium. Of this amount, \$585,000 was specified for the regional EMS programs, divided equally among the eight regions. About \$1.1 million for each year was specified to fund the board's operations. The rest of the funding was appropriated for ambulance training grants and for the ambulance service personnel longevity award and incentive program. [Laws of Minnesota for 2013, H.F. No. 1233] In addition to the General Fund appropriation, the board is anticipated to receive an estimated \$3.8 million for the 2014-2015 biennium in other state funds. (43, p.3)

Pennsylvania

History of the Trauma System and EMS. During the 1970s, the Pennsylvania EMS system began to grow due to state and federal financial support. Pennsylvania prioritized emergency healthcare by providing funding through the General Fund budget in 1971. (20, p.19) The program was further bolstered by the passage of the federal Emergency Medical Services Systems Act of 1973. This law provided federal grants to states for the establishment of EMS systems. [Public Law 93-154]

Pennsylvania further developed the EMS system with the passage of legislation in 1976 to establish a comprehensive EMS system by providing grants to nonprofits and local governments. It was specified that 20 percent of the system's funding would support rural area systems, and this support was increased to 30 percent in 1978. Other developments during this time included the establishment of the Division of Emergency Health Services (later renamed the Division of Emergency Medical Services) under the Pennsylvania Department of Health, and the nonprofit Pennsylvania Emergency Health Services Council and regional councils were also established. (20, pp.19-20)

Funding for the EMS system became problematic due to reduced state and federal funding during the early 1980s. Then in 1985, Act 45 (the Emergency Medical Services Act) was passed. This law provided licensing and educational standards for service providers and EMS personnel, and it required a statewide EMS plan. The law also required the collection of data and established the Pennsylvania Trauma Systems Foundation, a 501(c)(3) foundation, to be the accrediting body for trauma centers. Before the creation of the Pennsylvania Trauma Systems Foundation, trauma centers were designated by the Department of Health. Lawsuits were filed against the Department of Health concerning trauma center designation, and stakeholders pushed for the creation of the foundation and for the entity to be the accrediting body in the Emergency Medical Services Act of 1985. (40) The Emergency Medical Services Act also established a fund called the Emergency Medical Services Operating Fund to be administered by the Department of Health. (20, p.20)

Some changes to the EMS system have occurred recently. The Bureau of Emergency Medical Services was established in 2006. Also, Act 37 of 2009 addressed data collection and reporting requirements, as well as revisions to the statewide plan. (20, p.21)

Successes. The successes achieved by the trauma system in Pennsylvania may be due to inclusive processes. For example, the trauma centers are a part of the decision-making processes in revising and interpreting standards for designating trauma centers.⁹ The quality of the trauma registry data is also of note, due to a good system of checks and balances, inter-rater reliability processes, and quality improvement efforts. Also, Pennsylvania has instituted statewide performance improvement software for most of the trauma centers to use (except for Level IV trauma centers). (40)

Challenges. One major challenge in Pennsylvania is coordinating the trauma system functions between the Bureau of Emergency Medical Services and the Pennsylvania Trauma Systems Foundation and to make sure that work is not conducted in silos. There has been confusion expressed about knowing which entity is the lead agency, as well as unifying the trauma data with EMS data. Further, including rural areas in the trauma system can be challenging. The designation of Level IV trauma centers could assist in meeting this challenge. (40)

Comparison. Although Pennsylvania's population is almost double Indiana's population, there are some similarities between the two states relating to EMS. Besides the similarities indicated in Table 13, there were further similarities reported in the 2011 National EMS Assessment study prepared for the Federal Interagency Committee on EMS.

There are some contrasts between the states when considering local EMS data collection and the involvement of EMS with the state trauma systems. For example, Pennsylvania reported having frequent participation with the state EMS office and local EMS data collection, while Indiana reported that their level of participation was "none." (11, p.120, 151) Both states require data submission from local EMS agencies. (11, p.291) Also, Pennsylvania reported that their state EMS data system links with trauma registry data, while Indiana reported that this is not the case. (11, p.305)

There are also differences when considering each state's trauma system organizational structure. In Pennsylvania, the lead agency for the trauma system and EMS is the Bureau of Emergency Medical Services within the Department of Health. However, Pennsylvania's trauma centers are designated by the Pennsylvania Trauma Systems Foundation. Also, Pennsylvania's current trauma system was enacted in 1985, while the law authorizing the creation of Indiana's trauma system was passed in 2006.

In Pennsylvania, the state appropriation for trauma centers in the 2013-14 budget was about \$8.6 million. (12) The Pennsylvania Trauma Systems Foundation receives funding through fees for site surveys, trauma center participation, survey visits, and education of hospitals pursuing accreditation. These fees and other revenue including a small federal grant for critical access hospitals amount to about \$1.5 million in revenue annually for the foundation. (40) After 2014 legislation goes into effect, the statewide trauma system in Indiana may receive up to \$1.0 million annually from the Spinal Cord and Brain Injury Fund and other sources.

⁹ The Pennsylvania Trauma Systems Foundation develops their own standards that incorporate the minimum ACS standards.

Table 13. Pennsylvania and Indiana Comparison

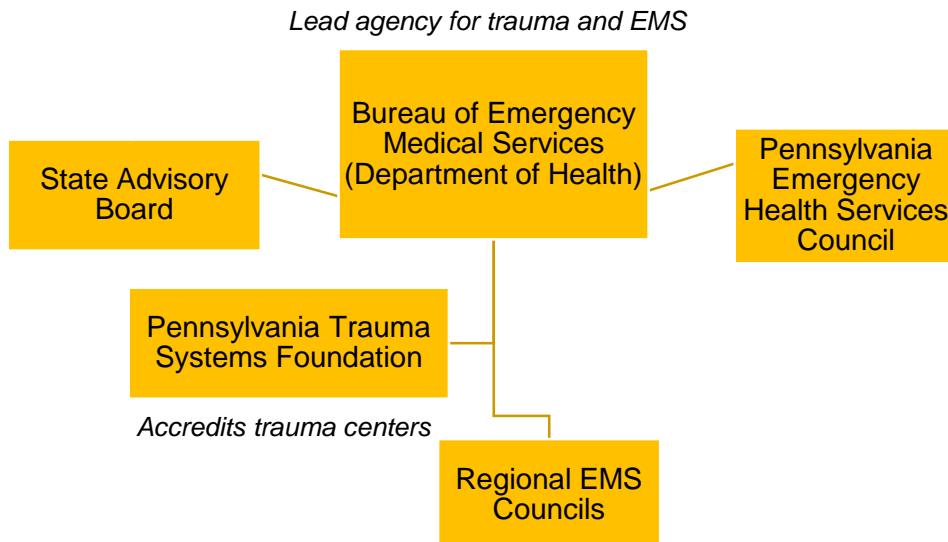
	Pennsylvania	Indiana
Population (2010 Census) (46)	12,773,801	6,483,802
Age Distribution of Population (21)		
Children 0-8	23%	27%
Adults 19-64	62%	59%
Adults 65 +	15%	15%
Population Distribution by Metropolitan Status (22)		
Metropolitan	82%	73%
Nonmetropolitan	18%	27%
Injury Death Rates per 100,000 Population (7)*	58.98	59.29
State Funding for Trauma System (Annual)	\$10.1 M**	\$1.0 M
Selected Metrics from the 2011 National EMS Assessment Study (11, pp.12, 44, 69, 90-92, 107, 111, 149, 150-52, 305)		
Total Number of Licensed EMS Agencies	More than 500	More than 500
Percentage of First Responders Considered Volunteer	76% - 100%	76% - 100%
Percentage of EMS Credentialed Professionals Working for Fire-Based EMS Agencies	1% - 25%	26% - 50%
Percentage of 911 Response Agencies in County/Equivalent with Transport Capability Considered Rural	51% - 75%	51% - 75%
Number of Credentialed First Responders	5,001 – 20,000	5,001 – 20,000
Number of Credentialed EMT-Basic Professionals	More than 20,000	5,001 – 20,000
Number of Credentialed EMT-Paramedic Professionals	5,001 – 20,000	2,001 – 5,000
Number of Credentialed Vehicles	More than 2,500	More than 2,500
Level of Participation with Local EMS Data Collection	Frequent	None
Level of Participation with Local EMS Technical Assistance	Minimal	Frequent
Level of Participation with Trauma Center Designation	Minimal	None
Level of Participation with Trauma System Management	Minimal	Minimal
State EMS Data System Links with Trauma Registry Data	Yes	No

* The data sources are the NCHS Vital Statistics System for numbers of deaths and the Census Bureau for population estimates. These figures include all injuries, all intents, all races, all ethnicities, both sexes, all ages and reflect the age-adjusted rate.

**This amount reflects the state appropriation for trauma centers in the 2013-2014 budget and the \$1.5 million in revenue received by the Pennsylvania Trauma Systems Foundation.

Organization of the State Trauma System and EMS. The size and complexity of the Pennsylvania EMS system is demonstrated by noting that there were approximately 55,437 certified EMS providers, 1,073 licensed ambulance services, 4,559 emergency transport vehicles, 10,146 paramedics, 38,435 EMTs and 4,840 emergency medical responders in 2012. (20, p.5) The Pennsylvania Department of Health serves as the lead agency for EMS and trauma and develops the Statewide EMS System Plan. Within the Department of Health, the Bureau of Emergency Medical Services is the entity that is charged with the coordination of the EMS system.

Figure 13. Organization of the Pennsylvania Trauma System and EMS



There are 15 regional EMS councils that provide licensure and certification of ambulances as well as an education component for instructors. Regional EMS councils have medical directors and committees that consider various aspects of the EMS system and are able to make recommendations. The regional EMS councils serve under the direction of the Department of Health, and current law provides that there are several duties that they must perform if directed by the department. (20, p.6) These duties include:

1. Assisting in the achievement of statewide and regional EMS system components and goals outlined in the law pertaining to EMS system programs;
2. Assisting in the collection of data pertaining to EMS;
3. Preparing regional EMS system plans;
4. Assuring the availability of training and education programs for EMS providers;
5. Ensuring that feedback may be provided from facilities and EMS agencies in the region;
6. Establishing (with the approval of the Department of Health) protocols for regional EMS triage, treatment and transportation;
7. Advising local units, including public safety answering points, regarding EMS resources and recommending dispatch criteria. [35 Pa. Cons. Stat. §8109]

Pennsylvania also has advisory bodies. Statute provides that the State Advisory Board consists of various organizations involved in EMS and must be geographically representative of provider organizations. Current law also provides that the board advise the Department of Health on matters pertaining to EMS agencies including regulations and policies adopted by the department, as well as the Statewide EMS System Plan. [35 Pa. Cons. Stat. §8108] The Pennsylvania Emergency Health Services Council, a 501(c)(3) foundation, also serves as an advisory body to the Department of Health concerning EMS.

The Pennsylvania Trauma Systems Foundation is the entity that is the accrediting entity for trauma centers. Statute charges the foundation with the development of standards for operating trauma centers, providing that the standards at least meet guidelines from the American College of Surgeons. The foundation is also charged with evaluating hospitals to determine whether they meet standards through site visits. Further, the Pennsylvania Trauma Systems Foundation is required to collect data for the trauma registry. [35 Pa. Cons. Stat. §8107]

The foundation has a 20-member board of directors that consists of various experts operating within the emergency health care industry and the Chairman and Minority Chairman of the House and Senate Committees on Health and Welfare (or their designees). The board decides whether trauma centers receive accreditation after reviewing site visit data.

Table 14. Pennsylvania Trauma Centers

Designation of Trauma Center	Count
Level I	17
Level II	13
Level III	1
Level IV	1
Total	32

Source: (37)

Trauma Centers. Trauma center levels indicate the level of care provided at the facilities, with Level I trauma centers providing the most comprehensive care. Trauma center designations I through IV are further explained on page 7 of this report.

The Pennsylvania Trauma Systems Foundation designates trauma centers as

Level I through Level IV for adult and pediatric care. Some trauma centers may have several designations. For example, one of the adult Level I trauma centers also has a Level I pediatric designation. Table 14 provides the number of trauma centers by level.

State Funding for the Trauma System. The Pennsylvania Trauma Systems Foundation receives funding through fees for site surveys, trauma center participation, survey visits, and education of hospitals pursuing accreditation. These fees and other revenue including a small federal grant for critical access hospitals amount to about \$1.5 million in revenue annually for the foundation. (40)

Level I through Level III trauma centers receive state and federal matching funds, and there is a formula for funding specified by law. Ninety percent of available funding is allocated to accredited Level I and Level II trauma centers. The balance of 10% is allocated to accredited Level III trauma centers and up to four years of funding for hospitals seeking Level III accreditation and providing evidence of achieving benchmarks toward accreditation. [Act of Oct. 22, 2010, P.L. 829, No. 84] The funding is then broken down based upon each trauma center's percentage of medical assistance and uninsured trauma cases and patient days compared to the statewide total. The state appropriation for trauma centers in the 2013-14 budget was about \$8.6 million. (12)

State Funding for EMS. The Emergency Medical Services Operating Fund was established in 1985 and is administered by the Department of Health. Current law provides that 75% of the money distributed into this fund supports eligible EMS agencies (with at least 10% allocated for rural area systems), regional councils, the Pennsylvania Emergency Health Services Council, the State Advisory Board, and other contractors and grantees. The remaining 25% of the funds are distributed to the Catastrophic Medical and Rehabilitation Fund for trauma victims.

The revenue sources supporting the Emergency Medical Services Operating Fund include surcharges on traffic citations, fees on those admitted to programs for Accelerated Rehabilitative Distribution due to driving under the influence of alcohol or controlled substances, fees, fines, and civil penalties collected by the Department of Health, and appropriations.

The Bureau of Emergency Medical Services receives about \$1 million in annual appropriations from the General Fund. (23, p.s-1) The regional councils also receive financial support for administrative and operating costs from sources besides the Emergency Medical Services Operating Fund, including in-kind assistance from county governments in some cases. (23, p.8)

An audit of the Emergency Medical Services Operating Fund was conducted for the Legislative Budget and Finance Committee and was released in September 2013. One of the major findings of the audit was that the funding for the EMS system has been declining due to declining revenue supporting the fund. More specifically, for the time period of fiscal year 2002 through fiscal year 2012, funding reached a high of about \$11.3 million for fiscal year 2007-2008 and declined to about \$10.0 million in fiscal year 2011-2012. (23, p.s-1) Also, the surcharges on traffic citations and fees associated with Accelerated Rehabilitative Distribution programs have not been increased since they were established in 1985 and 1988. (23, p.s-11)

Overview of State Agency Models

There are four national organizations involved with EMS and trauma care systems whose recommendations concerning state agencies were reviewed for this report. The same theoretical foundation underpins the works of these organizations, and their reports include many of the same key concepts, such as trauma care being based on the public health model of process improvement and reducing incidence of trauma through prevention. All of the organizations reviewed recommend a strong lead agency at the state level; they differ on whether the agency should be a single state agency or a lead agency coordinating key participants.

The national organizations reviewed for this evaluation include:

- The U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA)
- The National Highway Traffic Safety Administration (NHTSA)
- The National Association of State EMS Offices (NASEMSO)
- The American College of Surgeons (ACS)

According to the HRSA,

A key element to successful trauma system development is the integration of EMS, public health, incident management, and rehabilitation into trauma system plans. Input from these key participants at each stage of trauma system decision making is essential to establishing a workable system. Effective trauma systems require deliberate and clear integration of all components in each phase of care. (49, p.24)

Unifying the EMS and the state trauma system in one state agency is recommended by the NASEMSO, and an estimated 41 state trauma systems are organized in a single state agency. (17, p.7) The National Council of State Legislatures (NCSL) reports that 12 states have laws that enable a combined program for trauma and EMS systems. (61) However, models promoted by HRSA and the ACS do not specifically recommend a single state agency, but rather promote having a strong lead agency. The HRSA and the ACS advise that the lead agency for a state's trauma care system be able to communicate and unify all of the components of the trauma and EMS systems. NCSL says that 5 states explicitly reference the lead agency model in their state code. (61)

Specifically, ACS indicates that the rationale and purpose for a strong lead agency is that

[t]he lead agency, empowered through legislation, ensures system integrity and provides for program integration with other health care and community-based entities, namely, public health, EMS, disaster preparedness, emergency management, law enforcement, social services, and other community-based organizations. (3, p.23)

State Agency Model Office. NASEMSO's state EMS system model recommends a single overarching EMS agency housing specialty care system managers, such as an office for trauma. The model organizational chart indicates that the state EMS system director should be one level below a position that reports directly to the governor or in a stand-alone agency. Further, the model proposes a policy advisory body supporting the EMS system director and a separate advisory body supporting the EMS system medical director who reports to the EMS system director. The EMS system director would oversee three divisions including medical policy, regulation, and operations and technical assistance. (32, pp.9-11)

In this model, the office of trauma is one of the specialty systems under the direction of a care manager who reports through the operations and technical assistance manager to the EMS system director. Under this model, the trauma system would be three levels away from the governor and actually subordinate to the EMS system.

State Lead Agency Model. This model differs from the HRSA and ACS recommendations that suggest the lead agency work through multidisciplinary, multiagency advisory bodies. (49, p.23) The HRSA model requires the lead agency being able to adopt policy and standards, evaluate outcomes, and identify funding to bringing together the various system parts. (49, p. 23-24)

In 2008, the ACS consulted with ISDH to assist with the implementation of the state trauma system. Despite the model recommendation, the ACS recommended a lead agency for trauma care for Indiana specifically. (3, p.23) In its evaluation of Indiana, the ACS indicates that having multiple agencies involved in providing trauma care may create challenges in planning and coordination of a statewide system. (3, p.19)

State Agency Role. Regardless of the organizational structure of the state agency or agencies, the purpose of the state administration of trauma and EMS systems serves 10 key roles, listed below. (31, pp.6-7)

- (1) Monitor health status to identify community health problems.
- (2) Diagnose and investigate health problems and health hazards in the community.
- (3) Inform, educate, and empower people about health issues.
- (4) Mobilize community partnerships to identify and solve health problems.
- (5) Develop policies and plans that support individual and community health efforts.
- (6) Enforce laws and regulations that protect health and ensure safety.
- (7) Link people to needed personal health services and ensure the provision of health care when otherwise unavailable.
- (8) Ensure a competent public health and personal health care workforce.
- (9) Evaluate the effectiveness, accessibility, and quality of personal and population-based health services.
- (10) Conduct research to attain new insights and innovative solutions to health problems.

Within each role is a core function including assessment, policy development, and assurance that is the public health model of improvement and planning described in a previous section of the report. The key responsibility of state agencies within these core functions are:

- (1) Data collection and analysis
- (2) Building constituencies and aligning with stakeholder values
- (3) Identifying needs and setting priorities
- (4) Enabling legislative authority and procuring funding
- (5) Ensuring the public's health and safety
- (6) Measuring achievement in line with goals (49, pp. 22-27)

One takeaway from the literature on the state agency's or agencies' role in the trauma and EMS systems is that there is a degree of competency needed for regulation of the systems' facilities and personnel that are central to EMS services and trauma systems. The state administration needs to identify needs within the systems and address the needs with policy development, and recommendations appropriate legislation and securing funding. The state administration needs clear channels of communication among the divisions of EMS and specialty care programs, local programs and providers, and stakeholders. Data collection for policy development and to assure the alignment with program goals is one of the primary responsibilities of state agencies. Trauma and EMS systems are largely operated at the local level and the state administration is responsible for a cohesive policy to maximize coverage statewide.

Findings: Comparing Indiana's Trauma System to Trauma Systems in Other States

The following findings summarize some of the elements of state administration and organization that were observed by comparing Indiana's trauma system to the trauma systems in other states.

Trauma and EMS State Organizational Structures. Washington and Oregon are examples of states that have one state agency overseeing the trauma system and EMS. These states do not seem to experience the same issues that are experienced in Pennsylvania and Minnesota regarding the coordination of the statewide trauma systems and EMS.

In Minnesota, the Trauma Systems Program is housed in the Office of Rural Health and Primary Care under the direction of the Minnesota Department of Health, while a separate board—the Emergency Medical Services Regulatory Board—regulates EMS. A Joint Policy Committee was established in 2008 to improve coordination between the EMS Regulatory Board and the statewide trauma system. One of the major challenges experienced by the trauma system due to the organizational structure has been receiving data from the EMS Regulatory Board. (39)

While the Bureau of Emergency Medical Services is designated as the lead agency for trauma and EMS in Pennsylvania, a major challenge is coordinating the trauma system functions between the lead agency and the accrediting entity, the Pennsylvania Trauma Systems Foundation. There has been confusion expressed about knowing which entity is the lead agency. (40)

Importance of Data and Challenges. Trauma registries are vitally important to statewide trauma systems and assist in the provision of a comprehensive coordinated approach to care. Because the trauma system in Washington has been implemented since 1990, there has been data received for the trauma registry dating back to about the time of inception. The quality of the data has been helpful in the production of various studies that help to identify trends and evaluate the efficacy of the trauma system.

The quality of the trauma registry data in Pennsylvania is also of note, due to a good system of checks and balances, inter-rater reliability processes, and quality improvement efforts. Also, Pennsylvania has instituted statewide performance improvement software for most of the trauma centers to use (except for Level IV trauma centers). (40)

Oregon's EMS and Trauma Systems Program is focusing on making data reporting more automated in an effort to ensure that the trauma registry has robust data. Verification of the data was also expressed as an essential step in the process of ensuring the quality of the data. (42)

Minnesota has experienced difficulty obtaining EMS data from ambulances. Because this data is submitted to the EMS Regulatory Board, the trauma system does not have control over the quality or accuracy of the data. (39)

Issues and Challenges in Rural Areas. Oregon was one of the first states to develop a statewide trauma system and was the first state to include smaller rural hospitals in the system. (35, p.v) Also, 25 of the trauma hospitals are Level IV facilities (mostly located in rural areas), and it can be difficult for these facilities to devote a substantial amount of resources to the trauma program in terms of having adequate staffing to carry out functions such as conducting performance improvement. These facilities do not receive as many trauma cases as the other facilities with higher designated trauma levels. (42)

Minnesota's trauma system has been successful in including rural hospitals. In particular, this is demonstrated with the offering of trauma educational programs at different venues and the offering of a course led by family physicians that has provided a traveling trauma skills module. Minnesota was the first state to provide advanced trauma life support courses in rural areas. (28, p.12) Efforts such as these assist rural facilities with meeting the standards of the trauma program.

There are challenges facing Washington's trauma system, particularly within the rural areas of the state. (38) Transport times are longer in rural areas, and there is a greater prevalence of volunteer EMS providers

in rural areas compared to urban areas in Washington. The volunteer providers may not be equipped to provide advanced paramedic services compared to their paid counterparts. (54, p.4)

Findings: Indiana Agencies Administering EMS and State Trauma Systems

Interaction Confusion. Referring to Figure 7 on page 19, the ISDH and Homeland Security overlap in the facilities and personnel that they administer. While the system is not redundant, there is the possibility of confusion about the duties and responsibilities. An example of the overlap is the process for being certified as an “in the process” hospital. An application moves between the Indiana State Trauma Care Committee (ISTCC) for a recommendation and the EMS Commission for approval, while the EMS Branch posts and receives the application.

On the one hand, having both ISTCC, which is made up of representatives of trauma care facilities rather than prehospital providers (16), and the EMS Commission, which has statutory authority over EMS services facilities, have input in the determination makes sense. On the other hand, this arrangement has the potential to create confusion for regulated entities.

Data Collection. More striking is that the ISDH was tasked with trauma system development in 2006. More than eight years have passed, and a statewide trauma plan has not been adopted. To date, ISDH has worked on data collection and analysis with the trauma registry, developed triage protocols and a provisional designation system for trauma centers, and determined the number and level of trauma centers needed. Although much of this work has been completed in conjunction with the EMS Commission, the slowness of the process may be evidence of the lack of communication and cooperation between the agencies and within the system.

One critical piece is the collection of data from EMS services providers of prehospital encounters, which seems to have been an impairment to data collection. Outcome evaluation relies on knowing the status of the patient before and after interacting with the system. Homeland Security had a statutory duty to collect prehospital data from EMS services providers. The ISDH requested that the Homeland Security share the data so that the ISDH could connect prehospital services with the hospital patient data they were receiving from hospitals.

In 2012, the ISDH and Homeland Security entered into a memorandum of understanding to share these data after a more informal request had not produced much information. The ISDH indicated that some data were transferred at the beginning of the MOU, but that no data was received in 18 months of the 24-month agreement. (18) In October 2013, the ISDH adopted a rule requiring all EMS providers to submit data to the trauma registry using the most current version of the NEMSIS data elements and the criteria in the Indiana EMS Data Dictionary. [410 IAC 34-5-1]

In order for local EMS services providers to provide the prehospital data, the ISDH committed some of its Preventative Health Block Grant funds to purchase software and provide training to local EMS services providers. Once the EMS services providers were trained on the software, the ISDH reported receiving 1,000 prehospital reports a day. Overall, the ISDH has more than 300,000 prehospital reports in the trauma registry as compared to about 10,000 reports in the Homeland Security data. (18)

Funding. The ISDH appears to be successful at linking the trauma care system to other Indiana health care needs and using those links to provide funding needed in the trauma care system. In the example above, the ISDH was able to identify funding so that local EMS services providers could report directly and with better accuracy.

In another example, the ISDH identified a potential problem concerning training for intermediate and basic-advance EMTs into higher-level certifications. The ISDH identified and transferred \$50,000 in funding to train EMTs and paramedics through its rural health care funding. However, the EMS Branch was unable to use the money and returned the funding to the ISDH. (18)

Additionally, the status of the EMS Commission within Homeland Security is an issue. The EMS Commission is a policy-setting body with statutory rulemaking authority. It is also tasked with regulation and certification of EMS personnel. As the EMS Commission meets only six times a year, the staff of Homeland Security carries out many of the EMS Commission's duties. For example, EMS Branch staff investigates alleged bad practices, and an agency judge may cancel the license of a provider found to have violated state laws or rules. In this situation, the EMS Commission may hear the matter if the affected provider appeals the decision.

It is unclear whether the staff and resources available to the EMS Commission are sufficient to provide for continual improvement of practice and to make EMS a prominent program in the state. For example, Homeland Security is considering a recommendation by its consultant to determine fair and appropriate fees for certifications. This could provide additional funding for EMS services training assistance from the state for local EMS providers, but at the providers' expense.

Volunteerism and Rural Health. Homeland Security has stated that the EMS services system should remain at Homeland Security because of the connection between fire and EMS services. In Indiana, EMS services are often provided by fire departments, and firefighters are often trained as EMTs or paramedics. Many fire departments in Indiana are volunteer organizations, so that EMS services are being provided by volunteers.

The efficiency of having a single state agency interact with both fire and EMS services is apparent, and Homeland Security has a history of providing fire services through the State Fire Marshal and emergency management systems. Homeland Security also interacts with hospitals on a daily basis. (16)

However, from the sample of Indiana counties collected in the LSA Survey, it appears that many service providers are not volunteer fire departments, especially advanced level of care providers. And while fire (or police) may be at the scene when EMS services providers arrive, the duties of the EMS services providers are different from the fire or police. EMS services are public safety transportation with a health care twist. The combination of EMS services with fire services may have some organizational efficiencies. However, having a separate administration for EMS services may lead to better health care for the state overall.

The ISDH does not currently license individual personnel and does not administer programs where the providers are primarily volunteers. However, ISDH does provide services that strengthen the links between rural medicine and EMS services.

Conclusions

The Legislative Council requested a study evaluating the efficacy of administering all state programs relating to emergency medical services and the state's trauma system in one state agency.

From the review of the Indiana EMS and trauma systems, other states' systems, and review of national literature, it is apparent that these systems are part of the same process. However, not all of the trauma system is part of the EMS system, and trauma incidents are a small portion of the EMS workload.

The two systems are made up of the same facilities and personnel. For each system to work, the other system must be informed. And improvement within the two systems is made possible, in large part, from the data generated from the response of both systems. Funding is another key component to make systematic changes that will provide improved services, and the state agency's ability to identify resources for the systems is a dimension of state leadership. Also, there are many agencies at all levels of government involved in the EMS and trauma systems, suggesting that unifying disparate providers and facilities is an important role of state administration.

Collocating EMS and the state trauma system in a single state agency could potentially open channels of communication and align incentives among the ISDH and Homeland Security regarding EMS and trauma care. National models of state agencies indicate that communication and goal alignment are two main reasons for collocating EMS and trauma care.

As a result of these considerations, it would seem that combining EMS and the state trauma system would be reasonable to accomplish the goals of communication, funding, and system improvement. The systems could be combined and housed at the ISDH, at Homeland Security, or a stand-alone agency could be established, such as the one envisioned by the NASEMSO that would coordinate EMS and the specialty care components.

However, based on the literature and examples from other states, it is not a single agency structure that is important. It is most important to have a strong lead agency that is able to champion the needs of the EMS and trauma systems. Recent administrative and legislative actions, if successful, may facilitate some of these goals by providing means for better communication between the ISDH and Homeland Security without collocating the systems. The actions include:

- The reorganization of the EMS Commission and the EMS staff within Homeland Security under the State Fire Marshal. The implementation of this action was the result of the consultant report that recommended the reorganization to strengthen the support for EMS services at the local level. This reorganization has been in effect for only about eight months.
- The state EMS medical director position enacted in 2014 legislation. If the state EMS medical director is able to be a bridge between the ISDH and Homeland Security as the result of speaking both the language of public health policy and EMS services, it could be a large step forward to improving communications between EMS and the state trauma system.
- A state-based source of funding for the state's trauma system established in 2014 legislation. The ISDH may have resources to further develop data collection or invest in other programs that may improve the trauma system from the Spinal Cord and Brain Injury Fund.

If these measures significantly improve communication and cooperation among the agencies involved, collocation may prove to be a more costly and unnecessary option. However, if these actions are unsuccessful, collocation may ultimately be the more efficient and effective alternative.

Appendix A

Survey of Local EMS Systems

This survey is based on a national review of local emergency medical services (EMS) systems conducted on behalf of the National Highway Traffic Safety Administration in 2013. Legislative Services Agency (LSA) has adapted the survey for Indiana county emergency managers to learn more about Indiana EMS services at the local level. The questions concern the types of agencies providing services, the level of services available, and the financing of EMS services.

We recognize that EMS services are organized at a regional level and delivered at the local level. Looking at services at the county level may not provide details of the whole EMS services system, but will provide more detail about the local services available.

Contact Information

We do not publish the name of individuals responding to surveys or identify the source of quotes within our publications. However, it is helpful to have contact information for any follow up questions that may arise.

1. **Please enter your county name.**
2. **Please enter the name of the person completing the survey.**
3. **Please provide a contact name for follow up questions, if any.**
4. **Please provide a preferred method of contact and the contact information.**

Please let us know if you would prefer to be contacted by email or phone and provide the email address or phone number.

Local Agencies Providing Services

The national survey included questions about three separate areas of the EMS system; call taking and dispatch, emergency first response, and medical transport. In this section, we would like to focus on two of those areas - emergency medical response and emergency transport.

As you answer the questions in this section, please think about agencies in your county that provide the following EMS services:

Emergency Medical Response - The provision of medical services used in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

Emergency Transport - The emergency transport of patients from the scene to a health care facility.

5. Are EMS services in your county administered or provided by FIRE DEPARTMENTS?

The term "fire department" excludes combined agencies that provide law enforcement and fire protection. The term includes fire protection districts and fire territories. Please answer "yes" even if only a small portion of your county's EMS services are provided by fire departments.

Mark only one.

Yes *Skip to question 6.*

No *Skip to question 11.*

Fire Departments

In this section, please answer considering the EMS services that are administered or provided by fire departments in your county.

6. What percentage of all EMS services calls are handled by fire departments in your county?

An estimate is sufficient.

7. For EMS services provided by fire departments in your county, are the majority of fire departments volunteer or career?

Mark only one.

Volunteer
Career

8. For EMS services provided by fire departments in your county, are the majority of EMS service providers who work for the fire departments volunteer or career?

Mark only one.

Volunteer
Career

9. How are the EMS services provided by fire departments in your county financed?

You may select more than one answer.

Check all that apply.

Local taxes
State grants
Homeland security grants (federal)
Fees
Bill for service
Donations/Fundraisers

10. For EMS services provided by fire departments in your county and based on the equipment and vehicles available through those fire departments, what is the highest level of emergency medical response provided by the majority of fire departments in your county?

Please generalize about the level of emergency medical response provided by fire departments based on the equipment and vehicles to them.

Mark only one.

Advanced life support
Intermediate life support
Basic life support
No medical response by fire departments in my county

Local Agencies Providing Services

As you answer the questions in this section, please think about agencies in your county that provide the following EMS services:

Emergency Medical Response - The provision of medical services used in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

Emergency Transport - The emergency transport of patients from the scene to a health care facility.

11. Are EMS services in your county provided or administered by LAW ENFORCEMENT DEPARTMENTS?

The term 'law enforcement departments' excludes combined agencies that provide law enforcement and fire protection. Please answer "yes" even if only a small portion of your county's EMS services are provided by law enforcement departments.

Mark only one.

Yes *Skip to question 12.*
No *Skip to question 15.*

Law Enforcement Departments

In this section, please answer considering the EMS services that are administered or provided by law enforcement departments in your county.

12. What percentage of all EMS services calls are responded to by law enforcement departments in your county?

An estimate is sufficient. Please only consider the EMS services provided by the law enforcement departments in answering this question.

13. How are the EMS services provided by law enforcement departments in your county financed?

You may select more than one answer.

Check all that apply.

Local taxes
State grants
Homeland security grants (federal)
Fees
Bill for service
Donations/Fundraisers

14. For EMS services provided by law enforcement departments in your county and based on the equipment and vehicles available through those law enforcement departments, what is the highest level of emergency medical response provided by the majority of law enforcement departments in your county?

Please generalize about the level of emergency medical response provided by law enforcement departments based on the equipment and vehicles to them.

Mark only one.

Advanced life support
Intermediate life support
Basic life support
No medical response by law enforcement departments in my county

Local Agencies Providing Services

As you answer the questions in this section, please think about agencies in your county that provide the following EMS services:

Emergency Medical Response - The provision of medical services used in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

Emergency Transport - The emergency transport of patients from the scene to a health care facility.

15. Are EMS services in your county provided or administered by EMS-ONLY AGENCIES?

Examples of EMS-only agencies are ambulance services or an EMS department of government.

Mark only one.

Yes *Skip to question 16.*

No *Skip to question 20.*

EMS-Only Agencies

In this section, please answer considering the EMS services that are administered or provided by EMS-only agencies in your county.

16. What percentage of all EMS calls are responded to by EMS-only agencies in your county?

An estimate is sufficient.

17. In your county, are the majority of EMS-only agencies that provide EMS services governmental, nonprofit, or for-profit organizations?

Please answer for the majority of EMS-only agencies in your county.

Mark only one.

Governmental

Nonprofit

For-profit

18. How are the EMS services provided by EMS-only agencies in your county financed?

You may select more than one answer.

Check all that apply.

Local taxes

State grants

Homeland security grants (federal)

Fees

Bill for service

Donations/Fundraisers

19. For EMS services provided by EMS-only agencies in your county and based on the equipment and vehicles available through those EMS-only agencies, what is the highest level of emergency medical response provided by the majority of EMS-only agencies in your county?

Please generalize about the level of emergency medical response provided by EMS-only agencies based on the equipment and vehicles to them.

Mark only one.

Advanced life support

Intermediate life support

Basic life support

No medical response by EMS-only agencies in my county

Local Agencies Providing Services

As you answer the questions in this section, please think about agencies in your county that provide the following EMS services:

Emergency Medical Response - The provision of medical services used in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

Emergency Transport - The emergency transport of patients from the scene to a health care facility.

20. Are EMS services in your county provided or administered by PUBLIC SAFETY DEPARTMENTS?

Public safety departments combine law enforcement and fire services in one agency.

Mark only one.

Yes *Skip to question 21.*

No *Skip to question 24.*

Public Safety Departments

In this section, please answer considering the EMS services that are administered or provided by public safety departments in your county.

21. What percentage of all EMS services calls are responded to by public safety departments in your county?

An estimate is sufficient.

22. How are the EMS services provided by public safety departments in your county financed?

You may select more than one answer.

Check all that apply.

Local taxes
State grants
Homeland security grants (federal)
Fees
Bill for service
Donations/Fundraisers

23. For EMS services provided by public safety departments in your county and based on the equipment and vehicles available through those public safety departments, what is the highest level of emergency medical response provided by the majority of public safety departments in your county?

Please generalize about the level of emergency medical response provided by public safety departments based on the equipment and vehicles to them.

Mark only one.

Advanced life support
Intermediate life support
Basic life support
No medical response by public safety departments in my county

Local Agencies Providing Services

Emergency Medical Response - The provision of medical services used in serving an individual's need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

Emergency Transport - The emergency transport of patients from the scene to a health care facility.

24. Do HOSPITALS in your county provide EMS services?

In answering this question, please consider whether hospitals in your county respond to emergencies "in the field". Answer "no" if hospitals in your county only provide emergency room services or sponsor other organizations that provide EMS services.

Mark only one.

Yes *Skip to question 25.*

No *Skip to question 29.*

Hospitals

In this section, please answer considering the EMS services that are administered or provided by hospitals in your county.

25. What percentage of all EMS calls are responded to by hospitals in your county?

An estimate is sufficient.

26. In your county, are the majority of hospitals that provide EMS services governmental, nonprofit, or for-profit organizations?

Please answer for the majority of hospitals in your county.

Mark only one.

Governmental

Nonprofit

For-profit

27. How are the EMS services provided by hospitals in your county financed?

You may select more than one answer.

Check all that apply.

Local taxes

State grants

Homeland security grants (federal)

Fees

Bill for service

Donations/Fundraisers

28. For EMS services provided by hospitals in your county and based on the equipment and vehicles available through those hospitals, what is the highest level of emergency medical response provided by the majority of hospitals in your county?

Please generalize about the level of emergency medical response provided by hospitals based on the equipment and vehicles to them.

Mark only one.

Advanced life support

Intermediate life support

Basic life support

No medical response by hospitals in my county.

Cross Borders

29. How frequently do emergency medical responders in your county respond to emergencies beyond the boundaries of their primary service area?

Mark only one.

Often (weekly or monthly)

Sometimes (3 or 4 times a year)

Rarely or Never (anything less than 3 times a year)

30. If you answered 'often', please explain why.

If you selected another answer, please go on to the next question.

31. How frequently do transport agencies in your county respond to emergencies beyond the boundaries of their primary service area?

Mark only one.

Often (weekly or monthly)

Sometimes (3 or 4 times a year)

Rarely or Never (anything less than 3 times a year)

32. If you answered 'often', please explain why.

If you selected another answer, please go on to the next question.

33. How frequently do units (emergency medical responders or transporters) from other EMS service areas respond to calls within your county?

Mark only one.

Often (weekly or monthly)

Sometimes (3 or 4 times a year)

Rarely or Never (anything less than three times a year)

34. If you answered 'often', please explain why.

If you selected another answer, please go on to the next question.

Providers

35. Please estimate the percentage of emergency medical responders in your county that serve as volunteers.

Please base your estimate on all the organizations in your county that provide EMS services.

36. Do you consider this percentage to be higher than other counties in your area?

37. Of the emergency medical responders in your county who are volunteers, please describe any compensation they may receive.

38. Please estimate the percentage of total emergency call volume that is handled by volunteers in your county.

Usage

39. In terms of emergency call taking and dispatch, do you have 24-hour/7-day-a-week staffing in your county?

Mark only one.

Yes

No

40. Do you have 24-hour/7-day-a-week staffing at emergency medical facilities (e.g., hospitals) in your county?

Mark only one.

Yes

No

41. Consider how rural or urban your county is. Do you have a volume of demand for EMS services in your county that is greater than similarly rural or urban counties?

Mark only one.

Yes

No

42. Consider the geographic size of your county. Do you have a volume of demand for EMS services in your county that is greater than similarly sized counties?

Mark only one.

Yes

No

43. Consider your county's population size. Do you have a volume of demand for EMS services in your county that is greater than counties with similarly sized populations?

Mark only one.

Yes

No

44. If you answered yes to any of the three previous questions, why do you think the demand is higher?

45. Please explain any difficulties you have with retaining or recruiting emergency medical personnel in your county.

Estimates

46. Please estimate the number of emergency medical providers (both volunteer and career) at all levels in your county

An estimate is sufficient.

47. For your county, please estimate the number of 911 calls for EMS services annually

An estimate is sufficient.

48. For your county, please estimate the number of EMS incidents responded to annually

An estimate is sufficient.

49. For your county, please estimate the number of patients transported by EMS annually

An estimate is sufficient.

50. Thank you for your time

If you have any additional comments, please include them here.

If you would like to contact me concerning the survey or any of your responses, please email or call.

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Sources

1. American College of Emergency Physicians website, <http://www.acep.org/Clinical---Practice-Management/The-Federal-EMSC-Program-Initiative/>, Retrieved May 29, 2014.
2. American College of Surgeons, *Minnesota Trauma System Consultation Report*, November 2007.
3. American College of Surgeons, Committee on Trauma, *Trauma System Consultation for the State of Indiana*, December 14-17, 2008.
4. Art Logsdon, Director, Division of Trauma and Injury Prevention, Indiana State Department of Health, email, May 7, 2014.
5. Art Logsdon, Director, Division of Trauma and Injury Prevention, Indiana State Department of Health, email, May 12, 2014.
6. Boyd, David R., *Trauma Systems Origins in the United States*, Journal of Trauma Nursing, Volume 17, Number 3, July –September 2010.
7. Data produced by the Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC, 2009-2010. Downloaded May 9, 2014.
8. Electronic communication from Linda Ames, Oregon Legislative Fiscal Office, April 16, 2014.
9. Electronic communication from Stella Rausch-Scott, Committee Coordinator, EMS & Trauma Systems, May 16, 2014.
10. Emergency Medical Services Commission minutes, February 14, 2014, Attachment #4.
11. Federal Interagency Committee on Emergency Medical Services. *2011 National EMS Assessment*. U.S. Department of Transportation, National Highway Traffic Safety Administration, Washington, DC, 2012. Available at www.ems.gov.
12. Governor's Budget Office, *2013-2014 Enacted Budget General Fund*, 6-30-2013, Retrieved May 7, 2014, from http://www.budget.state.pa.us/portal/server.pt/community/current_and_proposed_commonwealth_budgets/4566.
13. <http://trama.cml.upenn.edu/CML.TraumaCenters.Web/statepage.aspx?state=18&responseTime=60&transportMethod=F&year=2009>. Trauma Center Maps. Retrieved June 23, 2014.
14. <http://www.cdc.gov/widgets/trauma/Trauma.html>
15. <http://www.indianaemsc.org/>, Retrieved June 4, 2014.
16. Indiana Department of Homeland Security response to LSA questions, May 2014.
17. Indiana State Department of Health, *Trauma White Paper*, May 2012.
18. Indiana State Department of Health response to LSA questions, March 21, 2014.

19. Jacobson, Lewis E. MD, FACS, *Indiana State Trauma System: Where Have We Come From? Where Are We Going?*, PowerPoint presentation accessed at http://cardiofoundation.org/educational_series/presentations/10_emergency_medicine/Dr%20Jacobson.pdf.
20. Joint State Government Commission, General Assembly of the Commonwealth of Pennsylvania, *Staff Study of the Emergency Medical Services System in the Commonwealth of Pennsylvania*, December 2013.
21. Kaiser Family Foundation, *State Health Facts, Population Distribution by Age*, Retrieved May 9, 2014, from <http://kff.org/other/state-indicator/distribution-by-age/>.
22. Kaiser Family Foundation, *State Health Facts, Population Distribution by Metropolitan Status*, Retrieved May 11, 2014, from <http://kff.org/other/state-indicator/metropolitan-distribution/>.
23. Legislative Budget and Finance Committee, *A Performance Audit of the Emergency Medical Services Operating Fund*, Conducted Pursuant to HR 2012-315, September 2013.
24. MacKenzie, E.J., & Carlini, A.R. (2013, August), Characterizing local EMS systems, (Report No. DOT HS 811 824), Washington, DC: National Highway Traffic Safety Administration.
25. Michael Garvey, Director, EMS Division, Indiana Department of Homeland Security and Robin Stump, Interview, Fire Marshal Office, January 10, 2014.
26. Michael Garvey, Director, EMS Division, Indiana Department of Homeland Security, email, June 5, 2014.
27. Minnesota Department of Health, *A Quiet Crisis: Minnesota's Rural Ambulance Services at Risk*, December 2002.
28. Minnesota Department of Health, *Trauma System Implementation and Recommendations: Report to the Minnesota Legislature 2010*, January 2010.
29. Mullins, RJ, et al. *Influence of a Statewide Trauma System on Location of Hospitalization and Outcome of Injured Patients*, The Journal of Trauma: Injury, Infection, and Critical Care, 1996 Apr; 40(4): pp.536-46.
30. Mullins, RJ, et al. *Preferential Benefit of Implementation of a Statewide Trauma System in One of Two Adjacent States*, Journal of Trauma, 1998 Apr; 44(4): pp.609-16.
31. National Association of State EMS Officials, *State Emergency Medical Services Systems: A Model*, July 2008.
32. National Association of State EMS Officials, *State Emergency Medical Services System Models Project: Model State EMS System Lead Agency*, June 2010.
33. National Council of State Legislatures, *Trauma Report*, August 2012.
34. NEMSIS information, <http://www.nemsis.org>, Retrieved May 15, 2012.
35. Oregon Department of Human Services, Office of Community Health and Health Planning, Emergency Medical Services & Trauma Systems, *Oregon Trauma System: Biennial Report 2004-2005*.

36. Oregon Trauma System Hospitals, Revised February 1, 2012, <http://public.health.oregon.gov/ProviderPartnerResources/EMSTraumaSystems/TraumaSystems/Documents/hosp-map.pdf>, Retrieved May 14, 2014.
37. Pennsylvania Trauma Systems Foundation web site, <http://www.ptsf.org/>, Accessed April 10, 2014.
38. Phone interview with Kathy Schmitt, Manager of Research, Analysis, and Data Section, Office of Community Health Systems, April 10, 2014.
39. Phone interview with Chris Ballard, Trauma Center Coordinator, Minnesota Department of Health, April 14, 2014.
40. Phone interview with Juliet Geiger, Executive Director of the Pennsylvania Trauma Systems Foundation, May 5, 2014.
41. Phone interview with Pam Biladeau, Executive Director, Emergency Medical Services Regulatory Board, May 8, 2014.
42. Phone interview with Dr. Dana Selover, Director of EMS & Trauma Systems, Section Manager, Health Care Regulation and Quality Improvement. May 14, 2014.
43. State of Minnesota, *2014-2015 Governor's Budget-Emergency Medical Services Regulatory Board*
44. U.S. Census Bureau. *State and County Quick Facts: Minnesota and Indiana, 2010*. Retrieved April 16, 2014, from <http://quickfactsc.census.gov>.
45. U.S. Census Bureau. *State and County Quick Facts: Oregon and Indiana, 2010*. Retrieved April 16, 2014, from <http://quickfactsc.census.gov>.
46. U.S. Census Bureau. *State and County Quick Facts: Pennsylvania and Indiana, 2010*. Retrieved April 16, 2014, from <http://quickfactsc.census.gov>.
47. U.S. Census Bureau. *State and County Quick Facts: Washington and Indiana, 2010*. Retrieved April 16, 2014, from <http://quickfactsc.census.gov>.
48. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "Access to Trauma Centers in the United States," September 2009.
49. U.S. Department of Health and Human Services, Health Resources and Services Administration, *Model Trauma System Planning and Evaluation*, February 2006
50. U.S. Department of Health and Human Services, Health Resources and Services Administration, Rural Health Toolbox, accessed at <http://www.hrsa.gov/healthit/toolbox/RuralHealthITtoolbox/Introduction/critical.html>.
51. Washington State Department of Health web site. <http://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/EmergencyMedicalServicesEMSSystems/EMSandTrauma/CouncilsandCommittees.aspx>, Retrieved April 16, 2014.
52. Washington State Department of Health web site. <http://www.doh.wa.gov/LicensesPermitsandCertificates/FacilitiesNewReneworUpdate/TraumaCareFund.nd.aspx>, Retrieved April 16, 2014.
53. Washington State Department of Health, *2001-2003 Biennial State Plan: Washington State Emergency Medical Services and Trauma Care System Plan*, July 2001.

54. Washington State Department of Health, *Trauma and Emergency Cardiac and Stroke Systems*, Updated June 1, 2012.
55. Washington State Department of Health, *Trauma Care Fund-Hospital Grants, SFY 2014*.
56. Washington State Department of Health, Office of Emergency Medical Services and Trauma System, *Designation Application Level III Trauma Service, 2007-2009 Designation Cycle*, Exhibit B.
57. Washington State Department of Health Trauma Services, *DOH 530-101*, April 2014.
58. Witt O'Brien, *Organizational Effectiveness Review, Indiana Department of Homeland Security*, July 2013.
59. <https://rp.nemsis.org/reportportal/olap/MdxDesign.aspx>. Retrieved on June 23, 2014.
60. State Auditor's Database, fund 53110, balance as of June 30, 2013. Retrieved on June 23, 2014.
61. Electronic communication from Hollie Hendrikson, National Council of State Legislatures, May 28, 2014.